News Release

National Aeronautics and
Space Administration

Washington, DC 20546
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For Release
Oct. 1, 1998

ADMINISTRATOR DANIEL GOLDIN'S STATEMENT ON NASA'S FORTIETH ANNIVERSARY

Forty years ago, in 1958, the National Aeronautics and Space Administration was created with the boldest and most noble of missions: to pioneer the future. We were told to explore new frontiers and enhance life here on Earth. We were asked to instruct; we were expected to inspire. Forty years later, thanks to an American public with an unquenchable thirst for knowledge and a relentless sense of adventure, NASA has delivered.

Think about this: Forty years ago, jet passenger service was a novelty. Global communications meant a telephone line laid across the bottom of the Atlantic Ocean. When NASA was first getting started, the only way to track hurricanes was to fly planes directly over and into the storms. Our universe -- even the cosmic neighborhood just above our atmosphere -- was a mystery. In 1958, sending humans to the moon was pure science fiction.

But we dared to dream. We imagined what could be possible. And then along with our partners in industry and academia, we went to work.

In 1998, hundreds of millions of people ride American jets each year and new designs for flight go higher, faster and farther than ever before. Global space communications have helped create a global community. Weather satellites can detect the early evolution of an El Niño condition months in advance. There are still many mysteries to be solved, but Voyager, Galileo, the Hubble Space Telescope and other planetary and astronomy missions have circled neighboring planets, given us our first direct evidence that black holes exist, and begun to peer back at the very beginning of our universe. A space program that is forty years old has sent astronauts to the moon, robots to Mars, spacecraft to the farthest reaches of our solar system, and soon will help build the International Space Station. And for every step we take out there, we have contributed to a better quality of life right here. That is true whether it be the "spin-off" technology that helps us detect breast cancer earlier, or the child who looks up and knows that no longer is the sky the limit; it is the stars and beyond.

NASA has had a great forty years, but what the American people can be most proud of is this: When it comes to pioneering the future, we are just getting started. What will always define this aeronautics and space program -- and this country -- is our firm belief that there will forever be something to invent, somewhere to discover, someplace to visit.

Rest assured, NASA will do its best in the next forty years to find out just what and where that will be.

-end-

News Release

National Aeronautics and
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Washington, DC 20546
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For Release

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October 1, 1998

NOTE TO EDITORS: N98-62

NASA CONTRIBUTES TECHNOLOGY TO WAR AGAINST CANCER

In observance of October as Breast Cancer Awareness Month, NASA will release information on new ways aerospace research and technology is helping in the understanding, detection and treatment of all types of cancer.

A NASA fact sheet available on the Internet highlights diagnostic technology currently available and features NASA research and technology that may improve cancer diagnosis, surgical procedures and drug therapies in the future. The website address is: http://www.nasa.gov/women/welcome.html

Five critical cancer experiments will be conducted on the upcoming Space Shuttle mission, STS-95, currently targeted for launch on Oct. 29. A fact sheet describing these experiments will be available closer to launch.

Cancer is the second leading cause of death for Americans. According to the National Cancer Society, 564,800 Americans are expected to die of the disease this year -- more than 1,500 people a day. Men have a one in two lifetime risk of developing cancer and for women the risk is one in three. The National Cancer Institute estimates overall annual costs for cancer at $107 billion.

end

News Release

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For Release
October 1, 1998

RELEASE: 98-173

EARTH SCIENCES INSTRUMENT PROGRAM PARTICIPANTS ANNOUNCED

NASA's Office of Earth Sciences has begun a new program to develop and demonstrate new measurement technologies through ground-based laboratory activities. The Instrument Incubator Program (IIP) will reduce the risk, cost, size, and development time of Earth-observing instruments and enable new Earth-observation measurements.

"This new program is intended to bring together technological capabilities of academia, industry and government to enable NASA's Earth Sciences enterprise to accomplish its scientific and applications objectives," said Dr. Ghassem Asrar, Associate Administrator for Earth Sciences, NASA Headquarters, Washington, DC. "Through this program we intend to introduce technological innovations into the science and applications programs more frequently and reduce development time and risk, lowering the cost of future missions."

NASA received 123 proposals of which 27 have been selected. Selected projects include three from industry, six from NASA field centers, eight from universities and ten from national laboratories. The dollar value of the first round of IIP awards is approximately $20 million. Areas for instrument development within the program include land-cover and land-use change and global productivity research; seasonal-to-interannual climate variability and prediction; natural hazards research and applications; and long-term climate observations -- natural variability and change research, and atmospheric ozone research.

"The Earth Sciences enterprise is and will continue to operate in a restrictive budget environment for the foreseeable future. It is anticipated that commercial rather than custom spacecraft will be used for many missions. These commercial spacecraft may only support smaller payloads. Large, expensive scientific instruments are not affordable in this new environment, and innovation is absolutely essential to the future success of the Earth Sciences program," said John Kelley, IIP program executive, NASA Headquarters, Washington, DC.

-more-

The IIP will enable members of the scientific community to propose, build and launch new Earth Science payloads within a three- to four-year period. By focusing on a short turnaround time, NASA hopes to minimize cost while encouraging creative new designs for Earth Science instruments. This program represents the first time that the Earth Sciences enterprise has solicited technology proposals, establishing a benchmark for future solicitations.

A complete listing of the first group of awards is available on the Internet at URL:

http://www.hq.nasa.gov/office/ese/nra/winners_list.html

NASA's Office of Earth Sciences studies how our global environment is changing using the unique perspective available from space and airborne platforms. NASA is observing, documenting, and assessing large-scale environmental processes, with current emphases on seasonal-to-interannual climate variability, land-cover, land-use changes and global productivity, long-term climate change, atmospheric ozone research, and studies related to the monitoring and prediction of natural hazards to minimize the loss of human life and mitigate property damage. Satellite data, complemented by aircraft and ground data, are enabling researchers to better understand environmental changes, to determine how human activities may have contributed to these changes, and to understand the consequences of such changes.

-end-

NewsRelease

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For Release

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October 2, 1998

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RELEASE: 98-176

STATEMENT FOLLOWING CONCLUSION OF MOSCOW MEETINGS

The launches of the first International Space Station components -- the Zarya module and the Unity module -- remain on schedule following a series of technical meetings in Moscow that concluded today with a meeting of representatives from all international partners.

In today's meeting, all station partners reviewed and concurred with a plan to maintain the current launch schedule for Zarya, which will launch on a Russian Proton booster Nov. 20 from the Baikonur Cosmodrome, Kazakhstan, and for Unity, which will launch on the Space Shuttle Endeavour Dec. 3 from the Kennedy Space Center, FL.

The international partner representatives, members of the International Space Station Control Board, also reviewed plans for launch of the Russian-provided Service Module, the station's early living quarters, and confirmed its launch delay to July 1999. The international partners will reconvene in December at Kennedy, in conjunction with the launch of Unity, to further refine the station's assembly sequence.

NASA and the Russian Space Agency (RSA) also reached an agreement under which NASA could purchase services and hardware from RSA for $60 million (U.S.). The agreement could be implemented through an existing contract between NASA and RSA upon concurrence from Congress. Payment of the $60 million will be tied to confirmation of RSA's completion of milestones necessary to ensure the completion of critical early assembly activities related to the final integration and launch of the Service Module and initial Soyuz and Progress spacecraft.

-end-

News Release

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For Release

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October 5, 1998

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RELEASE: 98-177

METEOR THREAT TO SPACECRAFT ELEVATED BUT NOT SERIOUS

The Nov. 17 Leonids meteor storm will present an elevated, though not serious, threat to spacecraft in the vicinity of the Earth for about half a day, according to NASA and Department of Defense experts, who have been studying the potential risk.

The annual Leonids are expected to have an intensity not seen in more than three decades, but will not reach the levels of the 1966 meteor storm. Even so, the event could provide a spectacular "light show" for some parts of the world, particularly East Asia and the western Pacific region.

The Leonid meteors originate from the debris released from the Comet Tempel-Tuttle, which completes an orbit around the Sun every 33 years, leaving a trail of debris such as dust and other tiny particles in its path. Each November the Earth crosses this debris trail and the result is the Leonids meteor storm -- "shooting stars" streaking through Earth's upper atmosphere, sometimes at rates of dozens per hour.

When this passage occurs within a few years of the comet's closest approach to the Sun, called perihelion, conditions for encountering larger-than-normal numbers of meteors - a meteor storm -- may exist. Comet Tempel-Tuttle passed perihelion early in 1998, setting the stage for a probable meteor storm in 1998 and perhaps again in 1999, as jointly reported by NASA's Johnson Space Center Orbital Debris Program Office in Houston and the Air Force Deputy Chief of Staff for Air and Space Operations.

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Leonids travel at about 45 miles per second compared to about 12 miles per second for typical meteors. This means the risk of physical or electrical damage to near-Earth spacecraft will be greater than normal.

As a precaution, the Space Shuttle will not be in orbit during the Leonids storm, and the launch of the first element of the International Space Station will not take place until after the storm subsides. The Hubble Space Telescope will turn so that the opening to its mirrors and instruments is pointed away from the approaching meteors during the storm.

Other measures being taken by U.S. government satellite operators to reduce spacecraft risk from the Leonids include minimizing the spacecraft cross-section (including solar arrays) to the meteors; reorienting sensitive spacecraft surfaces away from the direction of the Leonids; powering down non-critical systems; developing contingency and recovery plans to counter the likely effects of electrical discharge; minimizing communications to the spacecraft during the threat period; and augmenting crews at spacecraft operations centers during the period of intense Leonids activity.

NASA and the Air Force will conduct studies of the 1998 Leonid storm and will use these data in forecasting the potential 1999 storm.

Additional information on the expected Leonids meteor storm can be found on the worldwide web at: **http://www-space.arc.nasa.gov/~leonid** and **http://www.spacecom.af.mil**

Simple software to calculate the probability of impacts by Leonid meteors on spacecraft in Earth orbit can be found on the worldwide web at: **http://see.msfc.nasa.gov**

- end -

News Release

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For Release

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October 6, 1998

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RELEASE: 98-178

ANTARCTIC OZONE DEPLETION SETS NEW SIZE RECORD

NASA and NOAA satellites show that the Antarctic ozone thinning covers the largest expanse of territory since the depletion developed in the early 1980s. The measurements were obtained this year between mid-August and early October using the Total Ozone Mapping Spectrometer (TOMS) instrument aboard NASA's Earth Probe (TOMS-EP) satellite and the Solar Backscatter Ultraviolet Instrument (SBUV) aboard the NOAA-14 satellite.

"This is the largest Antarctic ozone hole we've ever observed, and it's nearly the deepest," said Dr. Richard McPeters, Principal Investigator for Earth Probe TOMS.

Preliminary data from the satellites show that this year's ozone depletion reached a record size of 10.5 million square miles (27.3 million square kilometers) on Sept. 19, 1998. The previous record of 10.0 million square miles was set on Sept. 7, 1996.

The ozone level fell to 90 Dobson units on Sept. 30, 1998. This nearly equals the lowest value ever recorded of 88 Dobson Units seen on Sept. 28, 1994, over Antarctica.

Scientists are not concerned that the hole might be growing because they know it is a direct result of unusually cold stratospheric temperatures, though they do not know why it is colder this year. The decrease in ozone, however, could result in more acute solar or ultraviolet radiation exposure in southern Chile and Argentina if the ozone hole were to pass over that region. One of the primary concerns with an ozone hole of this size is that as the hole "breaks up," the ozone-depleted air will diffuse and reduce the overall ozone levels in the mid-latitudes of the southern hemisphere.

-more-

These ozone losses are caused by chlorine and bromine compounds released by chlorofluorocarbons (CFCs) and halons. Year-to-year variations of size and depth of the ozone hole depend on the variations in meteorological conditions. Scientists believe that the decrease in Antarctic ozone is attributed to unusually cold (by 5-9 degrees Fahrenheit) temperatures in the southern middle and polar latitudes. "This year was colder than normal and therefore enables greater activation of reactive chlorine that ultimately causes more ozone loss and lower ozone levels," said Dr. Alvin J. Miller of the National Centers for Environmental Prediction (NCEP).

This decrease in ozone was observed earlier than usual with the hole opening in mid-August about two weeks before a typical year. This is consistent with expectations, since chlorine levels have slightly increased since the early 1990s.

As a result of international agreements known as the Montreal Protocol on ozone-depleting substances (and its amendments), chlorine levels from CFCs already have peaked in the lower atmosphere and should peak in the Antarctic stratosphere within a few years. As we move into the next century, chlorine-catalyzed ozone losses resulting from CFCs and other chlorine-containing species will be reduced.

"An ozone hole of substantial depth and size is likely to continue to form for the next few years or until the stratospheric chlorine amount drops to its pre-ozone hole values," said Dr. Paul Newman at NASA's Goddard Space Flight Center (GSFC), Greenbelt, MD. "The decrease in chlorine in our atmosphere is analogous to using a small air cleaner to recycle all of the air in a large indoor sports stadium -- it will take a very, very long time."

Scientists and others have a keen interest in ozone depletion, given that the increased amounts of ultraviolet radiation that reach the Earth's surface because of ozone loss have the potential to increase the incidence of skin cancer and cataracts in humans, harm some crops, and interfere with marine life.

NASA and NOAA instruments have been measuring Antarctic ozone levels since the early 1970s. Since the discovery of the ozone hole in 1985, TOMS and SBUV have been key instruments for monitoring ozone levels over the Earth.

Analysis of TOMS and SBUV data have traced in detail the annual development of the Antarctic "ozone hole," a large area of intense ozone depletion that occurs between late August and early October. Analysis of the historical data indicated that the hole has existed since at least 1979.

A Dobson unit measures the physical thickness of the ozone layer at the pressure of the Earth's surface. The global average ozone layer thickness is 300 Dobson units, which equals three millimeters or 1/8th of an inch, and while not uniform, averages the thickness of two stacked pennies. In contrast during these annual occurrences, the ozone layer thickness in the ozone hole is about 100 Dobson units (1/25th of an inch or 1 millimeter thick), approximately the thickness of a single dime.

Ozone shields life on Earth from the harmful effects of the Sun's ultraviolet radiation. The ozone molecule is made up of three atoms of oxygen; ozone comprises a thin layer of the atmosphere which absorbs harmful ultraviolet radiation from the Sun. Most atmospheric ozone is found in a thin layer between 6-18 miles up.

TOMS ozone data and pictures are available on the Internet at the following URL:

http://toms.gsfc.nasa.gov
or through links at URL:
http://pao.gsfc.nasa.gov/

TOMS-EP and other ozone-measurement programs are key parts of a global environmental effort of NASA's Earth Science enterprise, a long-term research program designed to study Earth's land, oceans, atmosphere, ice and life as a total integrated system. Goddard developed and manages the operation of the TOMS-EP for NASA's Office of Earth Science, Washington, DC.

-end-

News Release

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For Release
October 7, 1998

NOTE TO EDITORS: N98-64

PREFLIGHT BRIEFINGS FOR STS-95 MISSION SET FOR OCTOBER 15

A series of background briefings on the upcoming STS-95 mission, which will feature the return of John Glenn to space and more than 80 scientific experiments investigating mysteries that range from the inner universe of the human body to studies of our own Sun, will be held on Thursday, Oct. 15, at NASA's Johnson Space Center (JSC), Houston, TX, beginning at 9 a.m. EDT.

The major objective of the mission is the deployment of the SPARTAN science spacecraft for 48 hours of free flight to document solar activity affecting Earth's environment. In addition, dozens of experiments housed in the Spacehab module in Discovery's cargo bay and in the Shuttle's middeck will investigate microgravity's effect on materials and the impact of weightlessness on the aging process.

The briefings will begin with an overview of the STS-95 mission at 9 a.m. EDT, followed by a Mission Science briefing at 10:30 a.m. A local-only briefing for reporters in attendance at JSC will be held at 11:45 a.m. to discuss the logistics involved in covering the STS-95 mission. That briefing will not be seen on NASA Television. Following a break for the daily NASA Video File at 12 p.m., a panel discussion, "Beyond the Frontier: The Past and Future of U.S. Human Space Flight," will begin at 12:30 p.m.

The STS-95 astronauts will hold their preflight press conference beginning at 2 p.m. Because of the limited time available for each briefing and the large number of media representatives expected to attend at JSC, only questions from reporters there and at NASA's Kennedy Space Center, FL, and Lewis Research Center, Cleveland, will be entertained. All of the briefings, however, with the exception of the mission logistics briefing, will be broadcast live on NASA Television.

NASA TV is available through the GE-2 satellite, Transponder 9C, located at 85 degrees West longitude, vertical polarization, with a frequency of 3880 Mhz, and audio at 6.8 MHz.

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Media planning to attend the briefings at JSC must notify the JSC newsroom by close of business on Oct. 13 to insure proper badging. JSC's newsroom can be reached by calling 281/483-5111. The fax number is 281/483-2000.

STS-95 PREFLIGHT BRIEFINGS Oct. 15, 1998 (All times shown are EDT)

9 a.m. MISSION OVERVIEW
Phil Engelauf, STS-95 Lead Flight Director
Craig Tooley, SPARTAN Mission Manager, NASA Goddard Space Flight Center (GSFC), Greenbelt, MD
Rud Moe, Payload Coordinator, GSFC

10:30 a.m. SCIENCE OVERVIEW
Dr. David Williams, Director, Space & Life Sciences, JSC
Dr. David Liskowsky, STS-95 Life Sciences Program Scientist
Dr. Richard Fisher, SPARTAN Project Scientist, GSFC
Joel Kearns, Manager, NASA's Microgravity Research Program, Marshall Space Flight Center, Huntsville, AL

11:45 a.m. STS-95 MEDIA LOGISTICS BRIEFING (Local Only for reporters at JSC; not broadcast on NASA TV)
Brian Welch, Director of Media Services, NASA Headquarters
Rob Navias, Deputy Director, Public Affairs, JSC

12 p.m. NASA TV VIDEO FILE

12:30 p.m. PANEL DISCUSSION: "BEYOND THE FRONTIER: THE PAST AND FUTURE OF U.S. HUMAN SPACE FLIGHT"
Jim Slade, ABC science correspondent
Scott Carpenter, Project Mercury astronaut
William E. Burrows, author, "This New Ocean"
Andrew Chaikin, author, "A Man on the Moon"

2 p.m. STS-95 CREW PRESS CONFERENCE
Curt Brown, Commander; Steve Lindsey, Pilot; Steve Robinson, Mission Specialist 1; Scott Parazynski, Mission Specialist 2; Pedro Duque, Mission Specialist 3 (ESA); Chiaki Mukai, Payload Specialist 1 (NASDA); John Glenn, Payload Specialist 2

IMPORTANT NOTE: During the STS-95 mission, there will be two opportunities for reporters to ask questions of Discovery's crew members while in orbit. Based on an on-time launch on Oct. 29, the first opportunity would occur on Sunday, Nov. 1, at 5:15 p.m. EST during a 40-minute news conference involving Commander Curt Brown and John Glenn only. Reporters must be at JSC to ask questions. The second opportunity will occur

on Thursday, Nov. 5, at 12:50 p.m. EST during a 45-minute news conference in which all of Discovery's seven crew members will be available for questions. The first 22 minutes of the news conference will be devoted to questions from U.S. reporters at JSC only, followed by 11 minutes of available time for questions from Japanese reporters at JSC, and 11 minutes of available time for questions from European reporters at the European Space Agency's Villafranca station located outside of Madrid, Spain. No other questions will be entertained from any other center. Reporters in attendance at other NASA centers may ask questions during the mission status briefings conducted from JSC starting on the second day of the flight.

-end-

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For Release

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October 8, 1998

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RELEASE: 98-179

HUBBLE GOES TO THE LIMIT IN SEARCH OF FARTHEST GALAXIES

Stretching the vision of NASA's Hubble Space Telescope farther across space and further back into time than ever before, astronomers have peered into a previously unseen realm of the universe.

A "long exposure" infrared image taken with Hubble's Near Infrared Camera and Multi-Object Spectrometer (NICMOS) has uncovered the faintest galaxies ever seen.

Astronomers believe some of these galaxies could be over 12 billion light-years away (depending on cosmological models) – making them the farthest objects ever seen. A powerful new generation of telescopes will be needed to confirm the suspected distances.

"NICMOS has parted the dark curtain that previously blocked our view of very distant objects and revealed a whole new cast of characters. We now have to study them to find out who, what and where they are. We are still finding new frontiers," said Rodger I. Thompson of the University of Arizona in Tucson.

"This is just our first tentative glimpse into the very remote universe," said Alan Dressler of the Carnegie Observatories in Pasadena, CA. "What we see may be the first stages of galaxy formation. But the objects are so faint that their true nature can only be explored with the advanced telescopes of the future."

"This observation is a major step toward fulfilling one of Hubble's key objectives: to search for the faintest and farthest objects in the universe," added Ed Weiler, NASA's acting Associate Administrator for Space Science.

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In a separate discovery, Thompson also found that faint red galaxies matched up with compact blue knots of light seen in the earlier visible light image. "This means that some objects that appeared to be separate galaxies in the optical image are really hot star-forming regions in much larger older galaxies," he said.

Prior to the NICMOS observation, a ten-day long exposure called the Hubble Deep Field was Space Telescope's benchmark for the "deepest" view into the universe (with the exception of the cosmic microwave background that is farther away than any structures seen in the universe).

Astronomers had to wait for the infrared camera to be installed on Hubble to look for unseen galaxies beyond the limits of the visible deep field photograph. Infrared sensitivity was needed because the expansion of the universe is expected to stretch the light of distant galaxies down to infrared wavelengths.

Thompson selected a portion of the original Hubble deep field and took long exposures with Hubble's near infrared camera. When the infrared and visible-light pictures were compared, Thompson found many new objects that were not seen in visible light.

In results to be published in the Astronomical Journal, Thompson precisely measured the infrared "colors" of the objects. He found some objects that had the expected color of a galaxy too distant to be detected in Hubble's optical deep field image.

Scheduled for launch in the year 2007, the Next Generation Space Telescope will take infrared spectra of candidate galaxies to confirm their distances, and its higher resolution will help reveal the shapes of these early objects.

The Space Telescope Science Institute is operated by the Association of Universities for Research in Astronomy, Inc. (AURA) for NASA, under contract with the Goddard Space Flight Center, Greenbelt, MD. The Hubble Space Telescope is a project of international cooperation between NASA and the European Space Agency.

-end-

EDITOR'S NOTE: Images and photo captions associated with this release are available on the Internet at:
http://oposite.stsci.edu/pubinfo/1998/32 or via links in
http://oposite.stsci.edu/pubinfo/latest.html or
http://oposite.stsci.edu/pubinfo/pictureshtml
GIF and JPEG images are available via anonymous ftp to oposite.stsci.edu
in /pubinfo/gif/9832.gif and /pubinfo/jpeg/9832.jpg
Higher resolution digital versions (300 dpi JPEG) of the release photos are available at:
http://oposite.stsci.edu/pubinfo/1998/32 TIFF files are available at:
http://oposite.stsci.edu/pubinfo/tiff/1998/9832.tif

NewsRelease

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For Release

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October 8, 1998

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RELEASE: 98-180

CONFERENCE REVIEWS PROGRESS OF NASA AERONAUTICS PROGRAM

One year ago, NASA set ten bold aeronautics and space transportation goals that will have a dramatic impact on the United States into the 21st Century. On Friday, Oct. 9, 1998, NASA's Lewis Research Center, Cleveland, OH, will host the inaugural "Turning Goals Into Reality" conference to present the progress being made toward those goals.

NASA representatives, university and industry partners, who developed the ten outcome-based goals, along with airlines, aircraft maintenance companies, air cargo firms and other government organizations, will come together to review and assess NASA's technology programs, partnerships and overall progress.

Panel discussions geared to each of the three "Pillars" -- Global Civil Aviation, Revolutionary Technology Leaps and Access to Space -- will be led by NASA Center Directors: Jerry Creedon, Langley Research Center, Hampton, VA; Henry McDonald, Ames Research Center, Moffett Field, CA; and Deputy Director Carolyn Griner, Marshall Space Flight Center, Huntsville, AL. Panelists will include representatives from the Federal Aviation Administration (FAA), General Electric, The Boeing Co., Williams International, Pratt & Whitney, Lockheed Martin Corp., Orbital Sciences Corp. and Rensselaer Polytechnic Institute.

Some of the innovations and technological breakthroughs achieved over the past year also will be displayed in the Lewis hangar. Researchers from NASA and industry will be on hand to discuss their accomplishments and the benefits people can expect to see as these technologies enter into the marketplace.

As part of this inaugural annual conference, NASA will present awards to industry and university and government teams that have made significant contributions or accomplishments in aviation research.

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This year's NASA Administrator's Award will be presented to the Center-TRACON Automation System Team of NASA's Ames Research Center, Langley Research Center and the FAA for its accomplishments in improving aviation system capacity.

The other award recipients include:

For accomplishments in aviation safety - The NASA Airframe Structural Integrity Program Team, including NASA's Langley Research Center; Lockheed Martin Missiles and Space Company; Cornell University and the University of Texas.

For accomplishments in environmental compatibility/emissions - The High-Speed Research Combustor Configuration Team of NASA's Lewis Research Center, GE Aircraft Engines and Pratt & Whitney.

For accomplishments in environmental compatibility/noise - The Advanced Subsonic Transport Engine Systems Noise Reduction Team of NASA's Langley Research Center, and Lewis Research Center; FAA; Allison Engine Company; AlliedSignal Engines; AYT Corporation; Boeing Commercial Airplane Group; Fluidyne; BF Goodrich Aerospace; GE Aircraft Engines; Lockheed Martin; Northrop Grumman; NYMA; Pratt & Whitney; Virginia Consortium of Engineering and Science Universities.

For accomplishments in affordable air travel - The Composite Wing Team of NASA's Langley Research Center and Boeing Commercial Airplane Group.

For accomplishments in high-speed travel - The PETI-5 Development team of NASA's Langley Research Center.

For accomplishments in general aviation - The Advanced General Aviation Transport Experiments Consortium (AGATE) of NASA's Langley and Lewis Research Centers, AGATE Alliance and the FAA.

For accomplishments in next-generation design tools and experimental aircraft - The APNASA Development Team of NASA's Lewis Research Center; U. S. Army Vehicle Technology Center; U.S. Air Force Research Laboratory Propulsion Directorate; Allison Engine Co.; AlliedSignal Engines; GE Aircraft Engines; ASE Technologies; OAI and NYMA.

For accomplishments in affordable access to space - The X-33/Reusable Launch Vehicle Propellant Densification Team of NASA's Lewis Research Center, Kennedy Space Center, and Marshall Space Flight Center; Sierra Lobo Inc.; Gilchrest; The Boeing Co.; Analex; ADF; and Lockheed Martin Michoud Space Systems.

In order to provide an opportunity for the Agency's stakeholders, the general public, educators and students to participate, the conference will be cybercast live through NASA's Learning Technologies Channel. To participate visit:

http://quest.arc.nasa.gov/ltc/lewis/tgir/index.html

Additional activities, NASA Facts, educational resources and the Aeronautics and Space Transportation Technology Annual Progress Report 1997-98, can be found on the conference Web site at:

http://www.hq.nasa.gov/office/aero/conf98/

- end -

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For Release

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October 8, 1998

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RELEASE: 98-181

NASA UNVEILS "SUPERSTARS OF MODERN AERONAUTICS" PAINTING

Twelve NASA scientists and engineers, selected as "Superstars of Modern Aeronautics," were recognized today in a special ceremony at NASA's Lewis Research Center, Cleveland, OH, where a painting portraying their images was unveiled.

The painting, by artist Alexander Bostic, was created to highlight NASA's Aeronautics program and to recognize a few of the many talented individuals who have contributed to the excellence of the United States' civil and military aircraft and air transportation system.

The "superstars," former or current NASA employees representing the four aeronautics centers, were chosen for their significant contributions to NASA's aeronautics programs over the past 50 years. Recognized on the painting are: Dr. Robert T. Jones, Dr. Jolen Flores and Dr. Karen L. Gundy-Burlet from NASA's Ames Research Center, Moffett Field, CA; Edwin J. Saltzman, Marta Bohn-Meyer and Dr. Kenneth W. Iliff from NASA's Dryden Flight Research Center, Edwards, CA; Dr. Richard Whitcomb, Dr. Kathy H. Abbott and Dr. James C. Newman, Jr., from NASA's Langley Research Center, Hampton, VA; and Dr. John J. Adamczyk, Albert L. Johns and Dr. Simon Ostrach from NASA's Lewis Research Center, Cleveland, OH.

A poster has also been designed, from the original painting, that will be used by educators to encourage their students to consider the many exciting and diverse career choices in the aeronautics field. Biographical sketches highlighting the subjects' educational background, technical achievements and contributions, current work assignment and interests are printed on the back of the poster. This "Superstars of Modern Aeronautics" poster is the third in a series of career awareness posters created by the Education Division at NASA Headquarters, Washington, DC.

Copies of the poster are available to educators. For more information, call 440/774-1151, ext. 249 or 293.

-end-

NewsRelease

National Aeronautics and
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Washington, D.C. 20546
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For Release

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October 9, 1998

NOTE TO EDITORS: N98-65

NASA CELEBRATES ITS 40th ANNIVERSARY THROUGH ART

On Oct. 15, NASA will celebrate its 40th Anniversary at a reception to be held at the National Museum of Women in the Arts, where the Agency will launch the newly published book, *NASA and the Exploration of Space.*

The book is a collaboration between NASA chief historian Roger Launius; curator of the NASA Art Program Bertram Ulrich; and the publishing house of Stewart, Tabori & Chang. Senator John Glenn -- a member of the STS-95 Space Shuttle crew, scheduled to launch in late October -- wrote the foreword to this book, which illustrates NASA's history through art commissioned and/or collected over three decades.

The NASA Art Program, established in 1963, currently commissions four or five artists annually for a modest honorarium. The total collection, by about 250 artists, is comprised of over 3,000 works that are housed at NASA and the Smithsonian's National Air and Space Museum in Washington, DC. Artists represented in the collection include Robert Rauschenberg, Norman Rockwell, Andy Warhol, Vija Celmins and the Starn Brothers.

NASA lends its works for exhibits around the country. A selection of paintings by women artists commissioned by NASA can be viewed at the National Museum of Women in the Arts until Nov. 8.

The reception begins at 6 p.m. EDT at the Museum, located at 1250 New York Avenue, NW, Washington, DC. Limited seating for bonafide media representatives is available on a first-come first-served basis. To RSVP for this event, contact Joanna Adamus in NASA's Public Services Division at 202/358-1716.

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October 9, 1998

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NOTE TO EDITORS: n98-66

NEW SHUTTLE PRESS KIT MAKES ONLINE DEBUT

The STS-95 press kit is now online, inaugurating a new service that will enable members of the news media and the public to obtain access to each mission's information earlier and with more detail than ever before.

The press kit can be accessed on the World-Wide Web at:

www.shuttlepresskit.com.

The menu of options available includes a mission profile; mission summary; flight plan; objectives and experiment information; crew information; payloads and links to other related websites; as well as a variety of other items. Each option on the menu contains a number of sub-topics and links to other related NASA sites, creating the most comprehensive press kit ever offered by NASA and its contractor partners.

The new online press kit was a collaborative effort between NASA, United Space Alliance and Boeing North American.

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For Release

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October 13, 1998

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RELEASE: 98-183

NASA 'SOFTWARE SCALPEL' HELPS DOCTORS PRACTICE OPERATIONS

A "software scalpel," combined with clear, accurate, three-dimensional (3-D) images of the human head, is helping doctors practice reconstructive surgery and visualize the outcome more accurately.

Using the new approach, a physician wearing 3-D glasses can see an image of a patient's head from all angles on a computer monitor, or on the surface of a large "immersive virtual reality work bench." Virtual reality is a computer-created environment that simulates real-life situations.

"To predict what the result will be in a real operation, the surgeon uses a computer mouse to mark the incision location and to ask the computer to 'cut' bone," said Muriel Ross of NASA's Ames Research Center, Moffett Field, CA. Ross is director of the Ames Center for Bioinformatics, which uses computer technology to improve medical practices. "The doctor can then remove the simulated piece of bone or can place it at a new angle or in a new position."

"Because some patients have severe injury to the head or diseases such as cancer, there are times when physicians must rebuild a person's head or face," Ross said.

"We are working on an addition to the scalpel software that will allow us to 'snap' a face back onto the 3-D image of the skull on which a doctor has practiced an operation," she said. "The doctor and the patient can then get a better idea of how the face will look after the actual operation."

"Eventually, we want to provide a virtual tool for surgeons to practice many sorts of surgery," said Aaron Lee, a student from Princeton University, who worked in Ross' lab to develop the Virtual Surgery Cutting Tool.

-more-

Each high-fidelity 3-D picture of a human head is known as a 'reconstruction,' or a computerized object. "The computerized reconstructions are highly accurate, 3-D visual models of the head, but can be made of any part of the human body," said Ross.

In the technique, a series of computed tomography (CT) scans are combined to make the 3-D image using Reconstruction of Serial Sections (ROSS) software previously developed by researchers at the Ames Center for Bioinformatics. The Ames team also combined features of the ROSS software with the CT scan version to reconstruct a breast tumor from magnetic resonance images.

The NASA Center for Bioinformatics at Ames is part of a larger National Biocomputation Center established by NASA and Stanford University, Palo Alto, CA, according to Ross. "The new center is a national resource to further the use of virtual reality in medicine," Ross said.

The Ames bioinformatics team is working on a variety of virtual reality computer tools to aid in complex facial reconstructive surgery and other procedures. Surgeons can use the big-screen workbench, special gloves, as well as computer tracking wands and other devices to manipulate 3-D computer images of patients.

The team is also interested in working with mastectomy patients who require breast reconstruction, and with children who need reconstructive surgery to correct deformities of the head and face. Eventually, software systems could be used in other medical specialties or surgical procedures.

In the future, virtual reality will allow surgeons to rehearse a great many complex procedures before operations, according to Ross. The team expects that, eventually, virtual reality will be a powerful teaching tool for medical students. A digital library of computerized "virtual patients" will be created that physicians can use to share information about uncommon procedures, according to researchers.

-end-

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RELEASE: 98-184

NASA DEVELOPING COMPUTERIZED BREAST CANCER DIAGNOSTIC TOOL

A NASA-Stanford University team is in the preliminary stages of developing a smart probe that can be used for breast cancer detection and analysis.

The probe is designed to 'see' a lump; determine by its features if it is cancerous; and then quickly predict how the disease may progress. Researchers say surgeons may be able to insert the computerized tool's needle-like tip into breast lumps to make instant diagnoses and long-term cancer predictions.

"This device will permit us to make real-time, detailed interpretations of breast tissue at the tip of the needle," said Robert Mah of NASA's Ames Research Center, Moffett Field, CA. Mah works in the Ames Neuroengineering Laboratory. "The instrument may allow health care providers to make expert, accurate diagnoses as well as to suggest proper, individualized treatment, even in remote areas."

"To enable the instrument to recognize cancer and predict its progress, we use special neural net software that is trained and learns from experience," he said. Scientists can teach the breast cancer diagnosis device to predict how aggressive the disease may be.

"We hope to use this device not only to detect cancer, but to understand the nature of an individual cancer," said Dr. Stefanie Jeffrey, Assistant Professor of Surgery and Chief of Breast Surgery, Stanford University School of Medicine, Stanford, CA. "This information may help us determine the distinctive features of a malignancy and how the disease may progress; more knowledge about the cancer may guide us to better individualizing treatment."

-more-

Jeffrey and Mah are working together to develop the new device. The researchers say that, once the smart probe has been adequately tested in the laboratory, Dr. Jeffrey will begin testing the device on human beings, perhaps by early 1999.

"Ultrasound will help guide the doctor to properly insert the smart probe into a breast lump," said Dr. Robyn Birdwell, Assistant Professor of Radiology, Breast Imaging Section at Stanford.

"The computer software uses pattern recognition to look for tell-tale characteristics of the lump," Mah said.

"The same technology used in the portable, smart probe could be used in other instruments to help in diagnosing and treating cancers found in other parts of the body, including the prostate and colon," neuroengineering team computer engineer Alex Galvagni said.

The breast cancer tool is a spinoff from a computerized robotic brain surgery assistant that was previously developed by Mah and neurosurgeon Dr. Russell Andrews.

The larger brain surgery device is a simple robot that can 'learn' the physical characteristics of the brain and may soon give surgeons finer control of surgical instruments during delicate brain operations.

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October 13, 1998

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RELEASE: 98-185

NASA DELAYS SHIPMENT OF X-RAY TELESCOPE TO KENNEDY SPACE CENTER TO ALLOW ADDITIONAL TESTING

NASA announced today it will delay shipment of the Advanced X-ray Astrophysics Facility (AXAF) from the prime contractor, TRW Space and Electronics Group, Redondo Beach, CA, to Kennedy Space Center, FL. The postponement, made following a review by NASA and TRW, will allow additional time for TRW to complete testing of the observatory and to replace an electrical switching box. AXAF had been scheduled for shipment later this month to meet a Jan. 21, 1999, launch date.

NASA also has directed a review of AXAF, by NASA Chief Engineer Dr. Daniel Mulville to be completed by mid-January 1999. A new shipment date and a new launch date will be confirmed after the review.

"We think it's prudent to wait to see what the review will tell us before we set shipment and launch dates, so we don't expect to ship AXAF before that. It was a difficult decision, but we evaluated a number of options for handling the remaining work, and selected the one that will give us the most assurance of successfully completing the work," said Kenneth Ledbetter, Director of the Mission and Payload Division of the Office of Space Science, NASA Headquarters.

The remaining testing includes trouble-shooting and de-bugging some elements of the ground test and flight software. In addition, testing will be done to verify changes made to the flight software.

"Our priority remains the safe and successful launch of a world-class observatory, which has been thoroughly tested and meets all requirements," said Fred Wojtalik, NASA Marshall Space Flight Center Observatory Projects Office manager in Huntsville, AL. Marshall manages development of the observatory for the Office of Space Science.

-more-

Once in orbit, the Advanced X-ray Astrophysics Facility will allow scientists from around the world to obtain unprecedented X-ray images of a variety of high-energy objects to help understand the structure and evolution of the universe. The observatory will not only help to probe these mysteries, but also will serve as a unique tool to study detailed physics in a laboratory that cannot be replicated here on Earth -- the universe itself.

- end -

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RELEASE: 98-186

NASA PILOTS FLY RUSSIAN TU-144LL FLYING LABORATORY

Two NASA research pilots became the first Americans to fly Russia's version of a supersonic transport during several evaluation flights of a modified Tu-144 jetliner last month.

The three evaluation flights took place over a two-week period in mid-to-late September from the Zhukovsky Air Development Center outside Moscow, Russia. These flights are part of a jointly funded activity by NASA's High Speed Research (HSR) program and the Boeing Commercial Airplane Group to obtain operational experience and experimental flight data on the Tu-144.

The two research pilots are Robert Rivers of NASA's Langley Research Center, Hampton, VA, and Gordon Fullerton of NASA's Dryden Flight Research Center, Edwards, CA. Fullerton was a NASA astronaut for 17 years before joining the Dryden staff as a research pilot in 1986. Rivers has been a research pilot at Langley since 1990. Before coming to Langley, Rivers worked at NASA's Johnson Space Center in Houston training astronaut pilots to land the Space Shuttle. Both men have extensive experience in a variety of aircraft.

-more-

In a previous NASA/Boeing program, the Tu-144 was modified by the Tupolev Aircraft Design Bureau in 1995-96 into the Tu-144LL Flying Laboratory to perform flight experiments as part of NASA's HSR Program. Knowledge gained from the flights will benefit NASA's efforts to develop the technology that will enable design of an efficient, environmentally friendly second-generation supersonic transport in this country.

Rivers and Fullerton were primarily concerned with the Tu-144LL's handling qualities at a variety of airspeeds and flight altitudes during their evaluations.

Although the Tu-144 reflects the operational and design technology of the 1960's, Fullerton said during a post-flight plane-side interview that it does what it was designed to do very well.

"This was my first look at the supersonic handling qualities, and the airplane is really in its element. Once getting through the speed of sound, it settles down, just sort of hums along. While the pitch is very sensitive because you're going so fast, the bank and roll is perfect -- very stable. It's clearly an airplane built to go fast."

After an initial subsonic evaluation flight, Rivers and Fullerton had the opportunity to individually evaluate the Tu-144LL's flying and handling qualities on the two remaining flights, which included acceleration runs to Mach 2 (twice the speed of sound), maneuvering and several approaches to the Zhukovsky runways.

Fullerton stressed that, despite procedural differences in how flight research is conducted in the two countries, teamwork exhibited by the Russians and their American counterparts led to a successful outcome of the evaluation flights.

"As a test pilot I relish the opportunity to fly a unique aircraft and the TU-144LL certainly falls into that category. Actual flight experience in this large supersonic aircraft will help us do a better job evaluating proposed designs of a future High Speed Civil Transport," Fullerton said. "It was a red-letter day on my calendar."

Rivers echoed Fullerton's assessment. "The handling qualities experiment in which Gordon Fullerton and I participated will have a positive impact on the ongoing High-Speed Research Program," he said. "It was a good opportunity for U.S. pilots to come here, subjectively evaluate the airplane, compare those evaluations to the objective data we've retrieved already from the aircraft, and determine if they match. In fact, the data that we have obtained closely matches how the aircraft flies," Rivers added.

The previous Tu-144LL flight program involved eight experiments -- six aboard the aircraft and two ground test engine experiments. Between November 1996 and February 1998 the Tu-144LL flew 19 research flights. The follow-on Tu-144LL program encompasses about eight flights, focusing on extensions of five experiments from the first project and two new experiments to measure fuel system temperatures and to define in-flight wing deflections.

- end -

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RELEASE: 98-187

AERONAUTICS ENTERPRISE REORGANIZES AND CHANGES NAME

NASA has renamed the Office of Aeronautics and Space Transportation Technology the Office of Aero-Space Technology and reorganized it to better meet the Agency's goals.

In announcing the reorganization, Associate Administrator for Aero-Space Technology Spence M. Armstrong said, "When NASA Administrator Dan Goldin asked me to take this position, he told me there were three objectives that he wanted to see accomplished within the first months of my tenure.

"First, Goldin wanted me to personally be an advocate for the Reusable Launch Vehicle programs to effect a cheaper means of access to space. Secondly, he wanted to see more synergy between the traditional Aeronautics role and the Space Transportation Technology role, which had been added to the office's responsibility as a result of an earlier Headquarters reorganization. Lastly, Goldin wanted to see progress in achieving the ten goals that NASA had established for the office just over a year ago. Specifically, he wanted to see 'road maps' or plans to achieve each goal and asked me to reorganize as necessary to achieve them," said Armstrong.

To accomplish these objectives, Armstrong sought the advice and consultation of the office's executive board which is comprised of the directors of NASA's Ames Research Center, Dryden Flight Research Center, Langley Research Center, Lewis Research Center and Marshall Space Flight Center plus Headquarters' division directors. The board quickly recognized and accepted that the enterprise needed to have a management focus that highlighted achieving its goals rather than the traditional method of overseeing individual programs. They offered two major reorganization recommendations: that a Goals Division be established to measure the progress toward achieving the goals; and also that an Institution Division be formulated so Headquarters would have a more significant role in taking care of institutional problems at the Field Centers such as facilities, infrastructure and employee issues. Another division, the Programs Division, will monitor the office's various programs.

The ten goals that NASA established for the enterprise include eight goals that deal with aviation, one with access to space and another with space transportation. NASA will work closely with the Federal Aviation Administration and other government agencies and industry partners to develop the technology necessary to attain these goals.

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October 14, 1998

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RELEASE: 98-188

JUPITER'S "WHITE OVALS" TAKE SCIENTISTS BY STORM

As powerful hurricanes pummel coastal areas on Earth, NASA space scientists are studying similar giant, swirling storms on distant Jupiter that have combined to spawn a storm as large as Earth itself.

Three separate cold storms, called "white ovals" because of their color and egg shapes, have been observed in one band around Jupiter's mid-section for half a century. Two of the storms recently merged to form a larger white oval, according to scientists studying data from NASA's Galileo spacecraft, the Hubble Space Telescope, and the Agency's Infrared Telescope Facility atop Mauna Kea, HI.

"The newly merged white oval is the strongest storm in our Solar System, with the exception of Jupiter's 200-year-old 'Great Red Spot' storm," according to Dr. Glenn Orton, senior research scientist at NASA's Jet Propulsion Laboratory (JPL), Pasadena, CA. "This may be the first time humans have ever observed such a large interaction between two storm systems."

Each of the white ovals that merged were about two-thirds the diameter of the Earth before the merger, when they combined to form a feature as large as the Earth's disc. Although scientists have observed the end result of the merger of the two white ovals, the actual "collision" took place under cover of darkness while Jupiter was turned away from view.

This new, powerful white oval has a mysterious trait, according to Orton. "We can see it, along with the other white ovals, at visible light and some infrared wavelengths, but we cannot see the new white oval at certain infrared wavelengths that peer underneath the storm's upper cloud layers," Orton said. This might mean the storm is in a transition stage, undergoing a rebirth after the merging of the two storms.

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"With mature white ovals, we can see the upwelling of winds in the center, which in turn leads to downwelling around it," Orton said. The new white oval has a very cold center (about -251 Fahrenheit or -157 Celsius) that is about one degree colder than its surroundings. "Because of this, the oval may have generated a thick cloud system which obscures the downwelling," Orton said, which could explain the new oval's "disappearing act" at some wavelengths.

Adding to the mystery is the fact that a nearby storm rotating in the opposite direction to the new white oval used to be warmer than its surrounding. "This probably means that the feature contained mostly downwelling winds," said Orton. However, Galileo's photopolarimeter radiometer instrument showed this feature had cooled down to temperatures that were about the same as its surroundings.

Orton suspects that this storm somehow lost power and is no longer spinning as fast or downwelling as strongly as a year ago. This storm was once positioned between the two smaller white ovals that merged, and Orton theorized that when this storm system lost power, it removed the buffering mechanism that kept the two original white ovals apart.

Orton and his colleague, Dr. Brendan Fisher, a Caltech postdoctoral fellow at JPL, based their conclusions about the temperatures using data gathered by Galileo on July 20, 1998, during the spacecraft's 17th orbit of Jupiter and its moons. Although much data from the flyby of Europa in that time period was lost because of a problem with the spacecraft's gyroscope, Galileo's photopolarimeter radiometer gathered the new data on the white ovals before the anomaly occurred.

The photopolarimeter radiometer measures temperature profiles and energy balance of Jupiter's atmosphere, helping scientists study the huge planet's cloud characteristics and composition. Scientists believe that the bright, visible clouds of the white ovals are composed of ammonia.

Galileo has been in orbit around Jupiter and its moons for 2 1/2 years, and is currently in the midst of a two-year mission extension, known as the Galileo Europa Mission. JPL manages the Galileo mission for NASA's Office of Space Science, Washington, DC. JPL is a division of Caltech, Pasadena, CA.

Related images and information on the Galileo mission are available on the Internet at the Galileo website:

http://www.jpl.nasa.gov/galileo

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RELEASE: 98-189

OFFICIAL LAUNCH DATE SET FOR STS-95 MISSION

NASA program rnanagers today set Oct. 29 as the official launch date for the STS-95 mission aboard the Shuttle Discovery, a scheduled nine-day flight in which the seven astronauts will conduct more than eighty scientific experiments investigating mysteries that span the realm from the inner universe of the human body to studies of our own Sun. The mission marks the return of John Glenn to space, 36 years after his history-making flight aboard Friendship 7 in February 1962, as the first American to orbit the Earth.

The Flight Readiness Review, held at NASA's Kennedy Space Center, FL, yesterday, was the final major review by all Shuttle project offices to evaluate the readiness of the flight crew and vehicle, as well as the launch and mission control flight teams.

"This flight will demonstrate the flexibility and importance of the Space Shuttle through the vast array of scientific experiments and a challenging on-orbit crew timeline. Also, as we observe NASA's 40th anniversary this month, we have the unique opportunity to refly the first American to orbit the Earth. John Glenn is certain to see, firsthand, the advances in human space flight from the early beginnings of the Mercury program to the construction of the International Space Station," said NASA's Johnson Space Center Director, George Abbey.

Discovery is scheduled for launch on Oct. 29 at 2 p.m. EST from Launch Pad 39B at the opening of a 2 1/2 hour launch window. The STS-95 mission is scheduled to last eight days, 21 hours, and 50 minutes. An on-time launch would result in a landing by Discovery at the Kennedy Space Center on Saturday, Nov. 7, at 11:50 a.m. EST.

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The STS-95 Mission Commander is Curt Brown. The pilot will be Steven Lindsey. Steve Robinson, Scott Parazynski and European Space Agency (ESA) astronaut Pedro Duque will serve as Mission Specialists. Glenn and Chiaki Mukai from the Japanese Space Agency (NASDA) will fly as Payload Specialists.

STS-95 will be the 25th flight of Discovery and the 92nd mission in Shuttle program history.

For complete biographical information on the STS-95 crew and other astronauts, see the NASA Internet astronaut biography home page at URL:

http://www.jsc.nasa.gov/Bios/

For additional information on the STS-95 mission, visit the Shuttle home page at **http://www.shuttle.nasa.gov** or the electronic press kit at:

http://www.shuttlepresskit.com

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RELEASE: 98-190

SOHO IS NEARLY BACK IN BUSINESS

High-quality new pictures of the Sun, taken earlier this week from the Solar and Heliospheric Observatory (SOHO), have raised hopes that the mission may soon be returned to scientific operations. Engineers have successfully reactivated nine of the 12 instruments on the European Space Agency (ESA)/NASA SOHO mission, which has been out of commission for nearly four months after contact was lost on June 24.

Images from the Michelson Doppler Imager and the Extreme Ultraviolet Imaging Telescope on SOHO are posted on the Internet at: **http://sohowww.nascom.nasa.gov**

"Scientists on both sides of the Atlantic have waited anxiously for the recovery of SOHO," commented Roger Bonnet, ESA's director of science. "Thanks to the extraordinary determination and skill of ESA and NASA personnel, with industrial contractors and scientific teams also playing their part, the world has recovered its chief watchdog on the Sun. SOHO is needed more than ever, because the Sun is rapidly becoming stormier with a mounting count of sunspots."

"It's very exciting to see these images again after so many weeks of concern. We hope that all the SOHO scientific instruments can be returned to the same level of health, so we can resume normal scientific operations in the near future," said Dr. Joseph Gurman, the U.S. project scientist for SOHO, and co-investigator on the Extreme Ultraviolet Imaging Telescope (EIT).

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"As of today, nine of the 12 instruments on board SOHO have been turned on. Four of them are already fully functional; the other five are still undergoing careful recommissioning activities. But so far no signs of damage due to thermal stress during the deep freeze have been detected. I tip my hat to the engineers who built this spacecraft and these sensitive but robust instruments," said Dr. Bernhard Fleck, the ESA project scientist for SOHO. The remaining three instruments will be switched on over the next few weeks..

The images are the latest success for the team during a complex, challenging recovery sequence. On July 23, SOHO was located using radar techniques with the 305-meter Arecibo, Puerto Rico, radio telescope of the U.S. National Astronomy and Ionosphere Center as a transmitter and a 70-meter dish of the NASA Deep Space Network as a receiver. SOHO first responded to radio transmissions on August 3, and telemetry from SOHO was received August 8, telling controllers the condition of the spacecraft and its instruments. The spacecraft's frozen hydrazine fuel was gradually thawed, and on September 16, SOHO's thrusters were fired to stop its spin and to place it in the correct orientation towards the Sun.

Prior to the interruption, instruments on SOHO had taken about two million images of the Sun, an activity representing over a terabyte (a trillion bytes) of data. After its launch on Dec. 2, 1995, SOHO revolutionized solar science by its special ability to observe simultaneously the interior and atmosphere of the Sun, and particles in the solar wind and the Sun's outer atmosphere.

SOHO observations have been the subject of more than 200 papers submitted to refereed, scientific journals. Apart from discoveries about flows of gas inside the Sun, giant "tornadoes" of hot, electrically charged gas, and clashing magnetic field-lines, SOHO also proved its worth as the chief watchdog for the Sun, giving early warning of eruptions that could affect the Earth.

SOHO operates at a special vantage point 1.5 million kilometers (about one million miles) out in space, on the sunward side of the Earth. The spacecraft was built in Europe and it carries both European and American instruments, with international science teams. SOHO was launched on an Atlas IIAS rocket and is operated from NASA's Goddard Space Flight Center in Greenbelt, Maryland.

In April 1998, SOHO's scientists celebrated two years of successful operations and the decision of ESA and NASA to extend the mission to 2003. The extension enables SOHO to observe intense solar activity, expected when the count of sunspots rises to a maximum around the year 2000.

- end -

The first EIT image taken in the Fe IX/X line at 171 A is available at:
http://sohowww.estec.esa.nl/operations/Recovery/eit_171_981013.gif
and

http://sohowww.nascom.nasa.gov/operations/Recovery/eit_171_981013.gif

The MDI image can be found at:
http://soi.stanford.edu

The latest SOHO EIT images can be found on the Web at:
http://umbra.nascom.nasa.gov/eit/eit_full_res.html

Details about the operations and about SOHO in general, can be found at:
http://sohowww.estec.esa.nl and **http://sohowww.nascom.nasa.gov**

Information on the recovery of SOHO can be found at:
http://sohowww.nascom.nasa.gov/operations/Recovery//operations/Recovery/

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October 16, 1998

RELEASE: 98-191

NASA SELECTS 345 INNOVATIVE SMALL BUSINESS PROJECTS

NASA has selected 345 research proposals for negotiation of Phase I contract awards for NASA's 1998 Small Business Innovation Research (SBIR) Program. The combined award total is expected to be approximately $24 million.

SBIR goals are to stimulate technological innovation, increase the use of small business (including women-owned and disadvantaged firms) in meeting federal research and development needs, and increase private-sector commercialization of results of federally funded research.

The 1998 solicitation closed on July 7, 1998. NASA received 2,335 proposals submitted by small, high-technology businesses from across the United States.

NASA's ten field centers reviewed proposals for technical merit and feasibility and relevance to NASA research and technology requirements. The selected firms will be awarded fixed-price contracts valued up to $70,000 each to perform a six-month Phase I feasibility study.

Companies that successfully complete the Phase I activities are eligible to compete for Phase II selection the following year. The Phase II award allows for a two-year, fixed-price contract up to $600,000.

The NASA SBIR Program Management Office is located at NASA's Goddard Space Flight Center, Greenbelt, MD, with executive oversight by NASA's Office of Aero-Space Technology, Washington, DC. Individual SBIR projects are managed by the NASA field centers.

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EDITOR'S NOTE: A listing of the companies selected for the program can be accessed on the Internet at URL: **http://sbir.nasa.gov**

NewsRelease

National Aeronautics and
Space Administration

Washington, D.C. 20546
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For Release

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October 21, 1998

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RELEASE: 98-192

JUPITER'S MOON CALLISTO MAY HIDE SALTY OCEAN

Jupiter's second largest moon, Callisto, may have a liquid ocean tucked under its icy, cratered crust, according to scientists studying data gathered by NASA's Galileo spacecraft.

The Galileo findings, to be published in the Oct. 22 issue of the journal Nature, reveal similarities between Callisto and another of Jupiter's moons, Europa, which has already displayed strong evidence of a subsurface ocean.

"Until now, we thought Callisto was a dead and boring moon, just a hunk of rock and ice," said Dr. Margaret Kivelson, space physics professor at the University of California at Los Angeles (UCLA) and principal investigator for Galileo's magnetometer instrument, which measures magnetic fields around Jupiter and its moons. "The new data certainly suggest that something is hidden below Callisto's surface, and that something may very well be a salty ocean."

This premise was inspired by Galileo data indicating that electrical currents flowing near Europa's surface cause changes in Europa's magnetic field. "This seemed to fit nicely with other data supporting the idea that beneath Europa's icy crust, a liquid ocean might be serving as a conductor of electricity," said Kivelson.

Armed with that information, Kivelson and UCLA colleagues Drs. Krishan K. Khurana, Raymond J. Walker, and Christopher T. Russell set out to test a similar theory about Callisto, "although it seemed far-fetched at the time," Kivelson said. The team went back and studied data obtained during Galileo's flybys of Callisto in November 1996, and June and September of 1997.

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Kivelson and her colleagues found signs that Callisto's magnetic field, like Europa's, is variable, which can be explained by the presence of varying electrical currents associated with Jupiter that flow near Callisto's surface. Their next challenge was to discover the source of the currents.

"Because Callisto's atmosphere is extremely tenuous and lacking in charged particles, it would not be sufficient to generate Callisto's magnetic field; nor would Callisto's icy crust be a good conductor, but there very well could be a layer of melted ice underneath," Kivelson said. "If this liquid were salty like Earth's oceans, it could carry sufficient electrical currents to produce the magnetic field."

Lending further credence to the premise of a subsurface ocean on Callisto, Galileo data showed that electrical currents were flowing in opposite directions at different times. "This is a key signature consistent with the idea of a salty ocean," Khurana added, "because it shows that Callisto's response, like Europa's, is synchronized with the effects of Jupiter's rotation."

Although scientists consider the possible presence of an ocean on Europa as one factor hinting that life could have developed there at some point, it is doubtful that Callisto could harbor life, according to Galileo Project Scientist Dr. Torrence Johnson of NASA's Jet Propulsion Laboratory (JPL), Pasadena, CA.

"The basic ingredients for life -- what we call 'pre-biotic chemistry' -- are abundant in many solar system objects, such as comets, asteroids and icy moons," Johnson explained. "Biologists believe liquid water and energy are then needed to actually support life, so it's exciting to find another place where we might have liquid water. But, energy is another matter, and currently, Callisto's ocean is only being heated by radioactive elements, whereas Europa has tidal energy as well," from its greater proximity to Jupiter.

Galileo flies by Callisto four more times between May and September of 1999, which may yield more clues about the possibility of a Callisto ocean. However, Kivelson said that scientists will rely heavily on theoretical models to test their interpretations about Callisto.

Kivelson and her team also are reexamining magnetometer data from Jupiter's largest moon, Ganymede, to address the tantalizing concept that Callisto and Europa may not be the only moons of Jupiter with subsurface oceans.

The latest Galileo exterior images of Callisto, released on Oct. 13, and a new artist's concept of a cutaway view of the moon's interior are available on the Internet at the Galileo website: **http://www.jpl.nasa.gov/galileo**

Galileo has been in orbit around Jupiter, studying the huge planet, its moons and its magnetic environment, for over 2 1/2 years. It is currently in the midst of a two-year extension known as the Galileo Europa Mission. Galileo is managed by JPL for NASA's Office of Space Science, Washington, DC. JPL is a division of Caltech, Pasadena, CA.

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News Release

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For Release

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October 22, 1998

RELEASE: 98-193

NASA SELECTS REGIONAL EARTH SCIENCE APPLICATIONS CENTERS

NASA's Office of Earth Science has selected nine public/private consortia throughout the U. S. to form seven Regional Earth Science Applications Centers (RESACs). The RESAC program will use NASA's Earth science results, technologies and data products to help resolve issues with regional economic and policy significance and to support regional assessments supporting the U.S. Global Change Research Program.

The centers selected will be comprised of "end-to-end" consortia (from user needs definition to product delivery) and will include members from the research community, private industry, public agencies and other potential information users in the public and private sectors. The selected consortia involve over 20 private companies, about ten state and local government agencies, 20 Federal agency regional offices, and 15 universities.

The RESACs will apply state-of-the-art NASA Earth science research results to such diverse areas as precision farm management; monitoring of forest growth and health; regional water resources and hydrology; assessment of the impact of long-term climate variability and change; land cover and land use mapping; agricultural crop disease and infestation detection; management of fire hazards; watershed and coastal management; environmental monitoring; and primary and secondary science education.

For example, one RESAC will address water management problems in the arid Southwestern U. S. Using hydrologic models derived from NASA-sponsored research, the RESAC will use spaceborne and airborne instruments to provide improved information on water resource availability. This information will assist planners in developing strategies for resource allocation among competing economic and environmental uses in a rapidly evolving global economy.

"Regional-scale problems are well-suited to NASA's Earth science data and technology; no other system of observation is available for analyzing such large-scale issues," said Dr. Ghassem Asrar, Associate Administrator for Earth Science, NASA Headquarters, Washington, DC. "This program will capitalize on the science and technology developed over the past decade by NASA's Earth Science enterprise to provide solutions to practical and societal problems that exist today and help in mitigating them in the future."

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"The selection of the RESACs is the first of a number of planned NASA initiatives to develop new methods for bringing together the research, service and user communities to apply NASA's research results to practical, near-term problems," added Alex Tuyahov, Manager, Earth Science Applications Research Program, NASA Headquarters.

The selected consortia are:

Northern Great Plains RESAC, led by George A. Seielstad of the University of North Dakota

Northeast Applications of Useable Technology In Land Planning for Urban Sprawl RESAC, led by Chester Arnold of the University of Connecticut

NASA Southwest Earth Science Applications Center, led by Roger C. Bales of the University of Arizona

Upper Great Lakes RESAC, led by Marvin E. Bauer of the University of Minnesota, St. Paul

Midwest Center for Natural Resource Management, led by George R. Diak of the University of Wisconsin, Madison

Wildlands Fire Hazard Center, led by Christopher Lee of the California State University, Dominguez Hills

Great Plains RESAC, led by Edward A. Martinko of the University of Kansas

California Water Resources Research and Applications Center, led by Norman L. Miller of the Lawrence Berkeley National Laboratory

Mid-Atlantic RESAC Consortium, led by Stephen D. Prince of the University of Maryland, College Park

NASA is investing approximately $14 million in these seven new RESACs in FY99. The three-year grants will take advantage of NASA's extensive Earth Science program, a long term effort to study human-induced and natural changes in the whole Earth system.

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For Release

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October 22, 1998

RELEASE: 98-194

STUDENTS WILL TALK TO JOHN GLENN ABOARD DISCOVERY

Students at two museums and a high school will have the opportunity to ask questions of STS-95 mission commander Curtis L. Brown Jr. and payload specialist John H. Glenn Jr. aboard the Space Shuttle Discovery. The audio-only education event is tentatively scheduled to begin at 12:25 PM EST on Saturday, Oct. 31, and last for 30 minutes.

Groups of students will be located at the John H. Glenn High School in New Concord, OH; the Center of Science and Industry (COSI) in Columbus, OH; and the Newseum in Arlington, VA. Students at COSI will be at the middle and high school level, while students at the Newseum and John H. Glenn High School will be at the high school level. The 30-minute event will be divided equally among the three sites.

For those interested in listening to the audio-only exchange, NASA Television will broadcast it on GE-2, transponder 9C, C-Band, located at 85 degrees West longitude. The frequency is 3880.0 Mhz. Polarization is vertical and audio is monaural at 6.8 MHz. NASA TV will show still pictures of the crew, the students, and the three participating facilities during the student-crewmember exchange. The time and date of this event are subject to change.

A transcript of the questions and answers will be placed on the NASA Spacelink website following the event: **http://spacelink.nasa.gov/Spacelink.Hot.Topics**

NASA TV coverage of this educational exchange will be simulcast on the Internet. By using free software, computers made within the last 2-3 years can be used to receive television-like programs. Another online program about STS-95 is scheduled just before the launch on Oct. 29. The topics will include vehicle preparation and information about the science payload. Remote students will be able to interact with NASA experts online. Both events can be found online at: **http://quest.arc.nasa.gov/ltc/sto/launch/sts95/**

To follow John Glenn more closely, go to this Spacelink site and click on "Next Shuttle Mission": **http://spacelink.nasa.gov/Spacelink.Hot.Topics/.index.html**

More information on the overall STS-95 mission and John Glenn in particular can be found at this website: **http://shuttle.nasa.gov/future/sts95/glenn.html**

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News Release

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For Release

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October 23, 1998

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RELEASE: 98-195

NASA HELPS "HOT" CITIES COOL DOWN

Environmental planning for the 2002 Olympic games, strategies to reduce ozone levels, focused tree-planting programs and identification of cool roofs are early spinoffs from a NASA urban study just concluding in three U.S. cities.

Researchers from NASA's Marshall Space Flight Center, Huntsville, AL, flew a thermal camera mounted on a NASA aircraft over Baton Rouge, LA; Sacramento, CA; and Salt Lake City, UT. The thermal camera took each city's temperature and produced an image that pinpoints the cities' "hot spots."

The researchers are using the images to study which city surfaces contribute to bubble-like accumulations of hot air, called urban heat islands. The bubbles of hot air develop over cities as naturally vegetated surfaces are replaced with asphalt, concrete, rooftops and other man-made materials.

"One thing's for sure, the three cities we've looked at were hot," said the study's lead investigator, Dr. Jeff Luvall of Marshall's Global Hydrology and Climate Center. "They can use a lot of trees and reflective rooftops."

Salt Lake City is using the early results to help plan sites for the 2002 Olympic Games and develop strategies to reduce ground-level ozone concentrations in the Salt Lake City valley. Though at high altitudes ozone protects the Earth from ultraviolet rays, at ground level it is a powerful and dangerous respiratory irritant found in cities during the summer's hottest months.

In Sacramento and Baton Rouge, city planners and tree-planting organizations are using the study to focus their tree-planting programs. "We are helping the cities

-more-

incorporate the study into their urban planning," said Maury Estes, an urban planner on the science team at Marshall. "By choosing strategic areas in which to plant trees and by encouraging the use of light-colored, reflective building material, we think that the cities can be cooled."

The science team will continue to analyze the thermal heat information and work with the cities to incorporate future results into the cities' plans. The team plans to disseminate its findings nationally so other cities can incorporate what the team has learned into their long-range growth plans.

This study is supported by NASA's Earth Science enterprise. The enterprise is responsible for a long-term, coordinated research effort to study the total Earth system and the effects of natural and human-induced changes on the global environment. This project also is aimed at the enterprise's efforts to make more near-term economic and societal benefits of Earth science research and data products available to the broader community of public and private users.

Working on the study are researchers from Marshall; the Environmental Protection Agency, Washington, DC; the Department of Energy, Washington, DC; Lawrence Berkeley National Laboratory, Berkeley, CA; Baton Rouge Green, LA; the Sacramento Tree Foundation, CA; Tree Utah, Salt Lake City; and the Utah State Energy Services Department, Salt Lake City.

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Note to Editors: Interviews with the NASA urban planner, heat island researchers and program coordinators in Baton Rouge, Sacramento and Salt Lake City are available via telephone, NASA TV live satellite link or by e-mail. For additional information, call Marshall's Media Relations Office at 256/544-0034. Images related to the study can be found at:

http://www.nasa.gov/newsinfo/urban.html

More information on the study and research updates can be found on the new Marshall Internet Web site at URL:

http://www.msfc.nasa.gov/news

News Release

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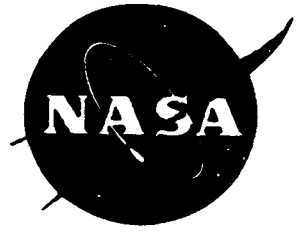

For Release

October 26, 1998

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RELEASE: 98-196

FIRST INTERNATIONAL SPACE STATION MODULE MOVES TO LAUNCH PAD

The International Space Station today moved to the doorstep of space as the first U.S.-built station component, the Unity connecting module, was moved to the launch pad to be loaded onto the Space Shuttle Endeavour.

Endeavour, scheduled for launch on Dec. 3 with an international six-person crew, will carry Unity to a rendezvous and attachment with the Zarya control module. Zarya is scheduled for launch on a Russian Proton rocket Nov. 20 from the Baikonur Cosmodrome, Kazakstan. Today's move completes work on Unity in the Kennedy Space Center's Space Station Processing Facility, a special hangar where the module has been undergoing final assembly, checkout and launch preparations since June 1997.

"There has been a tremendous amount of excellent work done by everyone involved with Unity from day one to get to this point," said Steve Francois, director of space station and shuttle payloads at Kennedy. "Unity represents the first new human spacecraft to go to a Kennedy launch pad since the first Space Shuttle launch 17 years ago. We're excited and ready to see Unity in orbit. We've got a processing facility full of other station components, and the centerpiece of the station, the U.S. Laboratory module, will arrive next month. The era of the International Space Station is here."

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More than a half-dozen major station components are in the processing facility, and by the end of the year more than 500,000 pounds of U.S. and international station equipment will have been completed. Upcoming milestones for Unity at the launch pad include an interface verification test, a check of electrical and data connections between Unity and Endeavour on Nov. 9, and the installation of Unity into Endeavour's payload bay on Nov. 13.

Unity, the cornerstone for the International Space Station, is a six-sided connecting module to which all future U.S. station modules will attach. Unity will serve as a habitable passageway to various parts of the station. Attached to Unity's forward and aft berthing ports for launch are two conical mating adapters, one to serve as a permanent connection to the Russian station segment and another that will serve as a Shuttle docking port.

Built by The Boeing Company for NASA, the 25,000-pound Unity began construction in 1994 at the Marshall Space Flight Center, Huntsville, AL. Because it is a station hub, more than six miles of electrical wiring, 216 lines that will carry fluids and gases and 50,000 mechanical items have been installed in Unity.

The International Space Station draws upon the resources and expertise of 16 nations and is the largest and most complex international scientific project ever undertaken to explore space for the benefit of all humankind.

-end-

News Release

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October 26, 1998

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RELEASE: 98-197

CREW MEMBERS NAMED FOR EARTH-MAPPING MISSION

An international cadre of astronauts will support an ambitious mission to map the Earth's surface when Endeavour launches on the STS-99 mission in September 1999.

Commander Kevin Kregel; Pilot Dom Gorie; and Mission Specialists Janet Kavandi, Ph.D.; Janice Voss, Ph.D.; Mamoru Mohri, Ph.D. (NASDA); and Gerhard P. J. Thiele (ESA) have been named to the Shuttle Radar Topography Mission (SRTM). SRTM evolved from the two 1994 Space Radar Laboratory missions, which collected data on geology, geography and oceanography.

During the mission, the crew will use specialized radar equipment and other electronics to map 80 percent of the Earth's land mass, extending from the southern tip of Greenland to the northern edge of the Antarctic Circle. Data targets will be spaced approximately every 90 feet and the resulting image should be accurate to within 30 feet of the height of the terrain.

Kregel was selected as an astronaut in 1992. He has logged more than 41 days in space during three missions: as pilot of STS-70 in 1995 and STS-78 in 1996, and as commander of STS-87 last year.

After being selected as an astronaut in 1994, Gorie served as pilot earlier this year on STS-91, the ninth and final Shuttle-Mir mission of the U.S.-Russian Phase One Program.

Kavandi was selected as an astronaut in 1994 and flew on board Discovery earlier this year with Gorie on STS-91.

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Voss will be making her fifth space flight on STS-99. She has flown previously on STS-57 in 1993, STS-63 in 1995; and STS-83 and STS-94 in 1997.

Mohri, of the Japanese Space Agency, is a member of the 1996 astronaut class. STS-99 will be his second space flight; he flew as a Payload Specialist on STS-47, the Spacelab-J mission, in 1992.

Thiele, of the European Space Agency, is a member of the 1996 astronaut class. This will be his first flight.

For additional information on the STS-99 crew, or any astronaut, see the NASA Internet biography home page at URL:

http://www.jsc.nasa.gov/Bios/

-end-

Contract Announcement

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For Release
October 27, 1998

RELEASE: C98-q

NASA AWARDS $99 MILLION CONTRACT TO TENNESSEE FIRM

NASA's Ames Research Center, Moffett Field, CA, has awarded a five-year contract valued at up to $99.3 million to Sverdrup Technology Inc., Tullahoma, TN. The contract covers aerospace testing and facility operation and maintenance services for Ames' directorates of Research and Development Services and Aeronautics.

The total value of the contract, including options, is $99,332,280. Sverdrup Technology Inc. will provide testing and facility operation, including wind tunnels, arc jets and other test and support facilities; performance of development projects; maintenance and repairs; and administration.

The contract runs for two years with two options, for one year and two years respectively. It is a cost-plus-incentive-fee/award-fee, performance-based contract.

- end -

News Release

National Aeronautics and
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For Release

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October 27, 1998

RELEASE: 98-198

TRIANA MISSION SELECTED

After a rigorous peer-review evaluation of nine competing proposals, NASA has selected a proposal from the Scripps Institution of Oceanography in La Jolla, CA, to implement the Triana mission with NASA's Goddard Space Flight Center, Greenbelt, MD.

Named for the sailor on Columbus' voyage who first saw the New World, Triana is a satellite mission to L1 (the Lagrange libration, or neutral gravity point between the Earth and the Sun). From L1, Triana will have a continuous, full disk, sunlit view of the Earth. The mission will provide this view of the Earth for distribution over the Internet at the beginning of the new millennium.

Dr. Francisco P.J. Valero of the Scripps Institution of Oceanography, a part of the University of California at San Diego, has been selected the Principal Investigator to lead development of the Triana mission. Dr. Valero's mission concept includes two scientific instruments: the Earth Polychromatic Imaging Camera (EPIC), to be built by Lockheed-Martin Advanced Technology Center of Palo Alto, CA, and an advanced radiometer, from a source to be selected later this fall. Triana also will include a small, next-generation space weather monitoring instrument to contribute to our understanding of how solar events affect Earth-orbiting spacecraft, such as communications satellites.

"An advanced radiometer at L1 will provide, by looking at the whole sunlit side of the Earth at once, the first direct measurements of the radiant power reflected by the planet, and thereby contribute to our knowledge of how much of the Sun's energy is absorbed in the Earth's atmosphere," said Dr. Valero. "The EPIC instrument will observe the Earth's vegetation canopy structure and evolution by taking advantage of the retro-reflectance, or 'hot spot,' view that will be available by being in-line between the Earth and the Sun. The EPIC also will observe clouds and aerosols."

"The L1 vantage point, with its full-disk view of the Earth, offers unique scientific advantages," said Dr. Ghassem Asrar, NASA's Associate Administrator for Earth Science. "The full-disk view of the Earth enables retrieval of global quantities at once, whereas

-more-

measurements from low Earth orbit or geostationary Earth orbit must be 'stitched' together, requiring concerted efforts to 'process out' differences due to viewing times and revisit intervals.

"L1 will be a prime vantage point for the next generation of Earth remote-sensing instruments. Triana will serve as a pathfinder for those future missions, providing scientific and operating experience in the L1 environment," said Asrar.

The Triana mission also will invite participation from the educational community. "We hope and expect to have widespread participation by students in every phase of this inspirational project. Students will benefit from 'hands-on' participation in Triana via the Internet and NASA's educational outreach efforts," Asrar said. NASA plans to solicit proposals for educational applications of Triana data next year.

Commercial participation also is possible for the Triana mission. Commercial enterprises have expressed an interest in contributing financially to Triana development in exchange for commercial rights to data. NASA will consider commercial partnerships for the Triana mission over the coming months.

NASA plans to proceed expeditiously on mission development. Goddard will provide a Small Explorer-lite spacecraft and ground system for Triana, as well as program integration and management support. Triana is a $75 million mission to be launched by December 2000 from the Space Shuttle cargo bay. Triana will be the latest in the Earth Probe series of missions in NASA's Earth Science enterprise, which seeks to understand the total Earth system and the effects of natural and human-induced changes on the global environment.

-end-

Contract Announcement

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October 28, 1998

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Release c98-r

NASA AWARDS LAUNCH SERVICES CONTRACTS FOR SMALL PAYLOADS

NASA has awarded two contracts to provide launch services for NASA and NASA-sponsored small-class payloads under the Small Expendable Launch Vehicle Services (SELVS-KSC) contracts. The companies are Coleman Research Corp., Orlando, FL, and Orbital Sciences Corp., Dulles, VA. The contracts will be administered by NASA's Kennedy Space Center (KSC), FL, and will include launches from Kennedy Space Center/Cape Canaveral Air Station, FL; Vandenberg Air Force Base, CA; and Wallops Flight Facility, VA.

The SELVS-KSC contracts will help fulfill the goals and objectives of NASA's Human Exploration and Development of Space enterprise, the Earth Science enterprise and the Space Science enterprise. The SELVS-KSC contracts are "Indefinite Delivery/Indefinite Quantity" contracts, meaning that the quantity of services to be provided will vary with NASA's needs.

NASA anticipates award of up to 16 missions over the contract's 5-year period. The minimum value of each contract is $100,000. The maximum value of each contract is $400 million. The contracts are 95 percent fixed price, with the remaining 5 percent allowed for performance of special studies.

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Loren Shriver, KSC's Deputy Director for Launch and Payload Processing, was the source selection authority for this procurement. "This is the first launch services acquisition activity performed by the Kennedy Space Center since being designated as the Lead Center for Acquisition and Management of Expendable Launch Vehicle Launch Services," said Shriver. "It will enable us to better serve our payload customers who will be flying small payloads. We look forward to partnering with Coleman and Orbital to provide excellent support to our Earth and Space Science Enterprise customers."

The launch vehicle to be used by Coleman Research Corporation under the contract will be the LK-0. The launch vehicles to be used by Orbital Sciences Corporation under the contract will be the Pegasus XL and the Taurus. Related work will be performed by Coleman Research Corp. in Orlando, FL, and by Orbital Sciences Corp. in Dulles, VA, and Chandler, AZ.

- end -

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October 28, 1998

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RELEASE: 98-199

METROPOLITAN L.A. UNDER A SLOW SQUEEZE

Downtown and West Los Angeles are moving toward the San Gabriel Mountains and the metropolitan area in between will be squeezed slowly over the next several thousand years, according to researchers using precise satellite surveying techniques at NASA's Jet Propulsion Laboratory (JPL), Pasadena, CA.

The measurements suggest that new mountains may be forming south of the high San Gabriel Mountains.

The results come from the Southern California Integrated Global Positioning System (GPS) Network, an array of 60 GPS receivers that continuously measures the constant, tiny movements of earthquake faults throughout Southern California.

"We've known for some time that the area between the coastline and the Mojave Desert is being squeezed together by the constant movement of Earth's crust," said Dr. Donald Argus, a geophysicist at JPL. "This new research helps pinpoint the area that's being squeezed. Specifically, downtown and West L.A. appear to be moving toward the San Gabriel Mountains at about one-fifth of an inch (half a centimeter) per year."

Argus is presenting his findings Oct. 29 at the annual meeting of the Geological Society of America in Toronto, Canada.

"While this research does not mean that an earthquake in Los Angeles is imminent, one possible conclusion is that the earthquakes that occur in Los Angeles might be concentrated in the northern part of the basin," Argus said.

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The GPS surveying system uses radio signals transmitted from 24 Earth-orbiting satellites operated by the U.S. departments of Defense and Transportation. Equipment on the ground receives signals from several satellites at a time, allowing scientists to pinpoint the position of a receiver to better than 0.4 inch (1 centimeter).

"The regional project is designed for exactly this kind of study. Our goal is to observe and monitor the slow, small motion, called strain, of the ground in greater Los Angeles," said JPL's Dr. Frank Webb, chair of the Southern California network. "This research helps us learn where earthquakes are more likely to happen, and helps with estimating the regional earthquake hazard in Southern California. It enables other agencies to make priorities about earthquake mitigation activities, including emergency preparedness and retrofit strategies."

There are about 60 GPS receivers on the ground around Southern California. Two new sites are being added every week with plans for a total of 250 more. The earthquake network began in 1990 with only four GPS receivers as a prototype funded by NASA. It detected very small motions of Earth's crust in Southern California associated with other California earthquakes in June 1992 in the town of Landers and in January 1994 in Northridge.

The Southern California network includes a number of institutions using GPS for earthquake research. The consortium is coordinated by the Southern California Earthquake Center, a National Science Foundation science and technology center at the University of Southern California (USC). The array is operated by JPL, USC, the U.S. Geological Survey and the Institute of Geophysics and Planetary Physics at the University of California at San Diego's Scripps Institution of Oceanography.

The JPL research is part of NASA's Earth Sciences enterprise, which seeks to understand the total Earth system and the effects of natural and human-induced changes on the global environment. JPL is a division of the California Institute of Technology.

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For Release

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October 28, 1998

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RELEASE: 98-200

NEW MARS IMAGES SHOW LAVA FLOW PLATES AND ACTIVE DUNES

The latest images from NASA's Mars Global Surveyor spacecraft show giant plates of solidified volcanic lava, and evidence for active dunes near the planet's north pole with sands that have hopped or rolled across the surface in recent months.

The images will be presented on Thursday, October 29, by members of the mission science team at the annual meeting of the Geological Society of America in Toronto, Canada.

The close-up views of Mars' Elysium Basin reveal the first evidence of huge plates of solidified lava, rather than lakebed sediments, that appear to have been broken up and transported across the Martian surface millions of years ago as they floated on top of molten lava. This implies that the area in the planet's northern lowlands was once the site of giant ponds of lava flows hundreds of kilometers across, according to Dr. Alfred S. McEwen of the University of Arizona, Tucson, a member of the Global Surveyor science team.

"NASA Viking mission images of the same region showed a surface of dark plates with intervening bright surfaces that did not quite make sense," McEwen said. "Some scientists thought they could somehow be volcanic, while others thought they might be related to differences in the way that wind had eroded a dried lakebed. With these new images in hand, it is now quite easy to understand the older, lower-resolution Viking images."

McEwen and his co-authors believe that lava erupted near this area and the upper surface became crusted, then cooled and cracked. Some cracks widened and portions of the surface crust became rafts of solid rock that moved in the direction that the molten lava was flowing underneath. Other Viking and Global Surveyor images have shown similar plate-like lava textures in nearby Marte Vallis, implying that some of the lava from Elysium Basin spilled into this valley and flowed thousands of kilometers to the northeast.

- more -

"The sparse occurrence of impact craters on these plate-like lava surfaces suggests that the eruptions happened relatively recently in Mars' history," McEwen explained. "These eruptions could be much younger than the youngest of the large Martian volcanoes like Ascraeus Mons and Olympus Mons in the Tharsis region, but they would still have occurred many, many millions of years ago. So these images should not be treated as evidence that Mars is volcanically active today."

Additional close-up views of Martian sand dunes in the north polar region are showing scientists detailed patterns of ongoing movement of sand across the planet for the first time. Drs. Kenneth S. Edgett, staff scientist at Malin Space Science Systems, San Diego, CA, and Michael Malin, Mars Global Surveyor camera principal investigator, report the presence of many fresh dunes that have been active as recently as July or August.

"The north polar cap of Mars is surrounded by a zone of dark dunes," Edgett said. "These were first seen by Mariner 9 as a rippled texture, and by the Viking orbiters as definitive sand dunes. Between late July and mid-September 1998, Mars Global Surveyor's closest passage over the planet took us right over the north polar dune fields four times a day. This provided us with many opportunities to take high-resolution pictures of these mounds."

Martian dunes typically contain granular fragments of rocks and minerals ranging from 0.002 to 0.08 inches (0.06 to 2 millimeters) in size, which puts them in the geologic classification of "sand." The sand appears to have been transported by wind in one of two ways: either by hopping over the ground, a geological process called "saltation," or by rolling along the ground, a process known as "traction."

Some of the dunes appear to be coated with thin, bright frost that was left over from the northern winter season that ended in mid-July, according to Edgett and Malin. This frost is covered with dark streaks emanating from small dark spots that dot the bases of many of the dunes. "The simplest explanation is that gusts of wind have blown the dark sand out across the frost-covered dunes, creating a streak of deposited sand over the frost," Malin said. "Some spots seen in the close-ups have multiple streaks, each one indicating that a different wind gust has moved in a different direction."

The images are available on the Internet at the following locations:
http://www.jpl.nasa.gov , **http://photojournal.jpl.nasa.gov** ,
http://mars.jpl.nasa.gov and **http://www.msss.com** .

Mars Global Surveyor is part of a sustained program of Mars exploration known as the Mars Surveyor Program. The mission is managed by the Jet Propulsion Laboratory, a division of the California Institute of Technology, Pasadena, CA, for NASA's Office of Space Science, Washington, DC. JPL's industrial partner is Lockheed Martin Astronautics, Denver, CO, which developed and operates the spacecraft.

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NewsRelease

National Aeronautics and
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For Release

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November 2, 1998

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RELEASE: c98-s

NASA AWARDS $90 MILLION CONTRACT TO VIRGINIA FIRM

NASA's Ames Research Center, Moffett Field, CA, has selected Logicon Syscon, Inc., Falls Church, VA, for award of a new six-year contract valued at $90.8 million (including options) to provide technical services for the aeronautical simulation facilities at Ames.

Under the terms of the contract, Logicon Syscon, Inc., will provide operations, development, maintenance and modification of the simulation laboratory facilities at Ames.

Included in the contract is the operation and maintenance of all Ames' flight simulators, including the Vertical Motion Simulator (VMS) and the Crew-Vehicle Systems Research Facility (CVSRF). The VMS, the world's largest motion-base simulator, was designed to aid in the study of helicopter and vertical/short take-off landing issues specifically relating to research in controls, guidance, displays, automation and handling qualities of existing or proposed aircraft.

The CVSRF, a unique national research resource, was designed for the study of human factors in aviation safety. It includes a Boeing 747-400 flight simulator, an advanced concepts flight simulator and a simulated air traffic control system. Both flight simulators are capable of full-mission simulation.

The contract includes a one-month phase-in period, a base period of 23 months, and two (2), two-year options for a total of six years. This is a cost-plus-incentive fee performance-based contract.

- end -

NewsRelease

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For Release

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November 6, 1998

MEDIA ADVISORY m98-71

NASA RELEASES EXTERNAL ANALYSIS OF HUMAN SPACE FLIGHT ALTERNATIVES

Hawthorne, Krauss, and Associates, LLC, today submitted its Analysis of Potential Alternatives to Reduce NASA's Cost of Human Access to Space --The Hawthorne Report -- to NASA Administrator Daniel S. Goldin. NASA will use the Hawthorne report, along with the Space Transportation Architecture Study (when complete), as a road map for its future space flight requirements.

The report is available online at:

ftp://ftp.hq.nasa.gov/pub/pao/reports/1998/Hawrep.pdf

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For Release
November 6, 1998

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NOTE TO EDITORS: n98-67

STS-95 CREW TO RETURN TO CELEBRATION IN HOUSTON

Following the completion of their nine-day space flight, the STS-95 astronauts will return to a heroes' welcome, open to the public, Sunday, Nov. 8, at Ellington Field near the Johnson Space Center (JSC), Houston, TX. If Discovery lands at the Kennedy Space Center (KSC), FL, or Edwards Air Force Base, CA, on Saturday, the astronauts will depart the landing site on Sunday morning and fly to Ellington Field for a crew return ceremony including their families planned for shortly after 1 p.m. EST.

The ceremony to welcome home STS-95 Mission Commander Curt Brown; Pilot Steve Lindsey; Mission Specialists Scott Parazynski, Steve Robinson and Pedro Duque; and Payload Specialists Chiaki Mukai and John Glenn will be held at Hanger 276 at Ellington Field. Houston Mayor Lee P. Brown will lead the well-wishers at Ellington, marking the homecoming for Discovery's space travelers.

The event, which will be carried live on NASA Television, is open to both the general public and the news media. Because the arrival time of the crew may change, anyone planning to attend the event should call the JSC recorded news information line at either 281/483-8600 or 281/483-6765 to get the latest updates on the crew's return. Mission credentials will provide members of the news media access to the ceremony.

The crew members are expected to make brief remarks, but there will be no question-and-answer session for reporters.

The astronauts will also participate in a downtown Houston parade on Wednesday, November 11, Veteran's Day, as Mayor Brown leads the city in honoring the STS-95 crew.

NASA Television can be seen on GE-2, Transponder 9C, at 85 degrees West longitude, vertical polarization, with a frequency of 3880 Mhz, and audio of 6.8 Mhz.

- end -

ADDITIONAL EDITORS' NOTE FOR MEDIA WISHING TO COVER CREW DEPARTURE FROM FLORIDA: If STS-95 lands at KSC as planned, the astronauts

- more -

currently are scheduled to leave for Houston from the Cape Canaveral Air Station Skid Strip at approximately 10 a.m. EST Sunday, Nov. 8. Media wishing to cover this activity should report to the KSC News Center no later than 8:30 a.m. EST Sunday for transport to the Skid Strip. (Contact: Bruce Buckingham at 407/867-2468)

NewsRelease

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For Release

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November 6, 1998

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NOTE TO EDITORS: N98-68

PRE-FLIGHT BRIEFINGS FOR STS-88 AND MARS MISSIONS SET FOR NOV. 13

A series of background briefings on the upcoming STS-88 mission, the first Space Shuttle flight for assembly of the International Space Station, will be held on Friday, Nov. 13, starting at 9 a.m. EST, at NASA's Johnson Space Center, Houston, TX. In addition, a mission science press briefing originating from NASA Headquarters, Washington, DC, to address the next NASA spacecraft to be sent to orbit and land on Mars, and new technology testbed probes designed to penetrate the planet's surface, will occur on Nov. 13 at noon EST.

All of the briefings will be broadcast live on NASA Television with multi-center question-and-answer capability.

On STS-88, Endeavour's six astronauts will attach the first two space station components in orbit. They will join the first U.S.-built module, the Unity connecting node, with the orbiting Zarya, a Russian-built, U.S.-owned control module scheduled to be launched by Russia from the Baikonur Cosmodrome in Kazakstan on Nov. 20. Later in the mission, three spacewalks will be conducted to complete connections between the two modules. The flight will begin the five-year orbital assembly of the station, one of the most complex and challenging space endeavors ever attempted, and will kick off a new era of international space exploration that brings together the resources and expertise of 16 nations.

The briefings will begin with an overview of the early International Space Station assembly flights and STS-88 in particular at 9 a.m. EST. An overview of the Zarya module and its mission, the Unity module and station assembly in orbit will begin at 10:30 a.m.

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The Mars mission science briefing will originate from NASA Headquarters at noon EST.

The Mars Climate Orbiter is due for launch at 1:56 p.m. EST on Dec. 10 on a Boeing Delta 2 launch vehicle from Cape Canaveral Air Station, FL, on its way to orbit the red planet beginning in September 1999. The Mars Polar Lander is due for launch at 3:21 p.m. EST on Jan. 3, 1999, on an identical Boeing Delta 2 from Cape Canaveral, toward a landing near the planet's south pole on Dec. 3, 1999. Riding aboard the cruise stage of the lander are two microprobes developed by NASA's New Millennium program, under the name Deep Space 2. The microprobes will be released just before atmospheric entry, and then will smash into the Martian surface near the landing site to test 10 advanced technologies and search for traces of subsurface water ice.

Extensive information on the Mars Surveyor 1998 missions and Deep Space 2 is available on the Internet at the following home pages:

http://mars.jpl.nasa.gov/msp98/

http://nmp.jpl.nasa.gov/ds2/

A briefing on the spacewalks planned for STS-88 and the spacewalk preparations that have been made for the station's assembly will be held at 1 p.m. EST. At 2 p.m. EST, astronauts and managers of the United States' first space station, Skylab, will take a retrospective look at that program on the occasion of its 25th anniversary.

The STS-88 astronauts will hold their preflight press conference at 3:30 p.m. EST. Following the press conference, the STS-88 crew will be available for individual interviews with media at JSC or by phone if arranged in advance. Those interested in individual interviews must contact the JSC newsroom at 281/483-5111 by 1 p.m. EST on Thursday, Nov. 12, to be included in the round-robin interviews.

NASA TV is available through the GE-2 satellite, transponder 9C, located at 85 degrees west longitude, vertical polarization, with a frequency of 3880 Mhz, and audio at 6.8 Mhz.

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STS-88 / MARS MISSION PREFLIGHT BRIEFINGS, Nov. 13, 1998
(All times are EST)

9 a.m.: MISSION OVERVIEW
Randy Brinkley, International Space Station (ISS) Program Manager
Dr. Kathryn Clark, Space Station Senior Scientist, NASA Headquarters
Bob Castle, STS-88 Lead Flight Director

10:30 a.m.: ZARYA, UNITY AND ISS ASSEMBLY
Frank Culbertson, ISS Deputy Program Manager for Operations
Doug Drewery, Zarya Launch Package Manager
Bill Bastedo, Unity Launch Package Manager

Noon: MARS MISSION SCIENCE BRIEFING
Dr. Carl Pilcher, Science Director for Solar System exploration, Office of Space Science, NASA Headquarters
John McNamee, Mars Surveyor 1998 Project Manager, NASA's Jet Propulsion Laboratory, Pasadena, CA
Dr. Richard Zurek, Mars Surveyor 1998 Project Scientist, JPL
Sarah Gavit, Deep Space 2 Project Manager, JPL
Dr. Bruce Jakosky, Planetary Scientist, University of Colorado, Boulder

1 p.m.: STS-88 SPACEWALKS
Greg Harbaugh, Extravehicular Activity (EVA) Project Office Manager, JSC
Scott Bleisath, STS-88 Lead EVA Officer

2 p.m.: SKYLAB 25th ANNIVERSARY RETROSPECTIVE
William Schneider, Skylab Program Manager
Joseph Kerwin, Skylab 2 Astronaut
Owen Garriott, Skylab 3 Astronaut
Bill Pogue, Skylab 4 Astronaut

3:30 p.m.: STS-88 CREW PRESS CONFERENCE
Bob Cabana, Commander
Rick Sturckow, Pilot
Jerry Ross, Mission Specialist 1
Nancy Currie, Mission Specialist 2
Jim Newman, Mission Specialist 3
Sergei Krikalev, Mission Specialist 4

-end-

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November 10, 1998

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Linda St. Thomas
Smithsonian Institution, Washington, DC
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RELEASE: 98-201

NASA TECHNOLOGY HELPS SMITHSONIAN PRESERVE THE STAR-SPANGLED BANNER

A NASA infrared camera developed to explore Mars will assist the Smithsonian Institution in its three-year project to preserve the Star-Spangled Banner.

The camera, built at NASA's Goddard Space Flight Center, Greenbelt, MD, is taking images this week of the historic flag in infrared light to help preservationists identify deteriorated and soiled areas not obvious to the human eye. The camera, called the Acousto-Optic Imaging Spectrometer (AImS), was developed by Dr. David Glenar at Goddard.

Considered a national treasure, the Star-Spangled Banner flew over Fort McHenry in Baltimore, MD, during the War of 1812 and inspired the words that became the U.S. national anthem. Despite receiving extra special care at the Smithsonian's National Museum of American History (NMAH), the flag is deteriorating from decades of exposure to light, air pollution and temperature fluctuations.

"It gives me a feeling of great pride that a camera we developed to explore other planets is now exploring this historic artifact," said Dr. John Hillman, lead of the camera group at Goddard and NASA's representative on the Smithsonian team. "The flag has never been viewed this way before, and we will see what cannot be seen with the unaided eye. This exciting project is one of many practical applications for this imaging technology."

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AlmS will take 72 separate images that will be pieced together using a computer to create a mosaic of the massive flag, which is 30 feet wide and 34 feet long. Each image takes approximately 25 minutes to make and is composed of 200 infrared wavelengths, or colors.

Infrared light is invisible to the human eye, lying beyond the red end of the visible portion of the electromagnetic spectrum. A spectrometer in the camera will be used to separate the light and reveal its component wavelengths, similar to the way a prism separates visible light into a rainbow of colors.

"Wool is the major component in the surface composition of the flag, and contaminants found on the surface of wool reflect infrared light differently than wool itself," Hillman explained. "With AlmS, we can identify where these differences are located on the flag. We are looking for things that can't be seen easily, or at all, with the human eye, such as moisture and oils. Moisture is of particular concern because, in the presence of light, it causes a chemical reaction that deteriorates wool."

"I selected AlmS because of its special ability to make an image with reflected infrared light," said Suzanne Thomassen-Krauss, chief conservator of the Star Spangled Banner Project at the NMAH. "A typical infrared camera relies on thermal infrared, which is light emitted by an object due to its heat, but these cameras cannot identify contaminants on the flag because they are the same temperature as the flag itself."

After the preservation effort is complete, the Star Spangled Banner will be returned to a newly renovated Flag Hall at the NMAH in Washington, DC.

The AlmS team is developing a demonstration camera for the Mars Instrument Development Program funded by NASA Headquarters. Under this program, a camera using AlmS technology could be a candidate for use on robotic Mars lander missions in 2005 and beyond. The camera would be used to determine the mineral composition of Martian rocks.

The camera also can be used to explore the invisible world here on Earth. A cooperative agreement to use AlmS in skin cancer research is in place with Goddard, Swales and Associates, Inc., and the Georgetown University Medical Center Department of Dermatology. "We also have had preliminary discussions with the University of Arizona, Tucson, to use our camera to analyze prehistoric sites," said Hillman.

In addition, Hillman may apply the camera in his personal efforts as a copyist at the National Gallery of Art, which involves detailed reproductions of classic art works to gain insights into the technique, motivations and intentions of the artist.

"AImS could permit a deeper understanding of a painting by revealing the underdrawing, which shows what the artist had in mind before applying the brush," Hillman said. "Another potential application for this camera is to determine the pigment used in the paint, which can distinguish an authentic piece from a forgery."

The AImS team includes Drs. Hillman and Glenar; Cheryl Vorvick and Chuck Peruso at Goddard; Dr. Nancy Chanover of the Astronomy Department at New Mexico State University in Las Cruces; Dr. Bill Blass of the University of Tennessee in Knoxville; and Dr. Jeff Goldstein of the Challenger Center for Space Science Education.

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For Release

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November 12, 1998

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RELEASE: 98-202

NASA ASTROBIOLOGY TO SHOWER ATTENTION ON LEONIDS

On Nov. 17, NASA scientists will conduct unprecedented, detailed aircraft and ground measurements of the Leonid meteor storm.

The Leonid meteors originate from a trail of dust and debris in the wake of the comet Tempel-Tuttle, which orbits the Sun every 33 years. The Earth crosses this trail every November, but every 33 years the debris trail is especially dense, sometimes resulting in a meteor storm. The "shooting stars" streak through Earth's upper atmosphere, sometimes at rates of up to thousands per hour. The storm's peak lasts approximately one hour. This year, Earth is expected to pass a region just behind the comet and outside of its orbit, a favorable set of conditions for a larger-than-normal storm event. The best viewing of this storm will be in eastern Asia and the western Pacific region.

NASA's mission consists of two research aircraft that will carry a broad array of scientific instruments to observe and explore the meteors. Operating simultaneously, the aircraft will provide three-dimensional views, making high-resolution stereoscopic images and spectrographic observations of meteor dynamics and chemistry. A team of interdisciplinary scientists -- astronomers, atmospheric physicists and meteor specialists -- will use state-of-the-art-sampling techniques to provide a "window on the sky" over Japan during the storm.

"The central theme of this mission is astrobiology," said Peter Jenniskens, mission principal investigator and astronomer at the Search for Extraterrestrial Intelligence (SETI) Institute, Mountain View, CA. "We are especially interested in learning the composition of Tempel-Tuttle's debris, the molecules that are created during the meteor's interaction with the Earth's atmosphere, and the composition and chemistry of the atoms, molecules and particles detected in the meteor's path. This may help us understand how extraterrestrial materials helped create the conditions on Earth necessary for the origin of life."

- more -

The Leonid mission is NASA's first operational astrobiology mission. Astrobiology is the study of the origin, evolution and destiny of life in the universe. The mission may provide important clues about what extraterrestrial materials were brought to Earth by comets, and what part that may have played in the beginnings of life on Earth, as well as clues on how biogenic compounds formed in stars are eventually incorporated into planets.

A modified L-188C Electra aircraft from the National Oceanic and Atmospheric Administration's (NOAA) National Center for Atmospheric Research in Boulder, CO, and sponsored by the National Science Foundation, will act as the mission "spotter" and recorder. It will carry a two-beam Lidar, a type of radar with light pulses that measures the altitude of neutral atom debris in the meteor trails. Other instruments include airglow, visible wavelength imagers and high-definition TV cameras.

Scientists aboard the first aircraft are seeking to learn how a meteor's mass compares to its brightness and to the mass of the resulting comet. Currently, they can only guess how much material enters the atmosphere during a meteor bombardment. Researchers will compare the meteor's image with information from the dual Lidar, providing an indication of the chemical evolution of the meteor debris.

The second aircraft, a U.S. Air Force-owned FISTA (Flying Infrared Signatures Technology Aircraft) from Edwards Air Force Base, CA, will have 20 upward-looking portholes to observe the meteors. It will carry imagers and infrared and visible-light spectrometers to dissect the meteor's light in search of the fingerprint of atoms and molecules.

The mission will fly out of Kadena AFB in Okinawa, Japan, over the East China Sea. The FISTA aircraft will fly as high as 39,000 feet to be above the lower atmosphere's water vapor layer, while the Electra will maintain an altitude of about 22,000 feet, just above the clouds.

NASA's Ames Research Center, Moffett Field, CA, is collaborating in this international effort with the SETI Institute, the National Science Foundation and several other science organizations. Aircraft and other support are being provided by NOAA and the U.S. Air Force. Instruments are being contributed by the University of Illinois at Urbana; the Aerospace Corporation; the Air Force Research Laboratory; the Japanese Broadcasting Company (NHK); Kobe University, Japan; the Ondrejov Observatory (Czech Republic); Mt. Allison University (Canada); the SETI Institute; and the University of East Anglia, England.

Additional information on the Leonid meteor storm and the mission can be found on the worldwide web at: http://www-space.arc.nasa.gov/~leonid/. During the mission, video animation and images will be available at:

http://leonid.arc.nasa.gov

- end -

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For Release

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NOTE TO EDITORS: N98-69

ZARYA BRIEFINGS AND LAUNCH COVERAGE SET

The launch of the first component of the new International Space Station, the Russian-built, U.S.-owned Zarya Control Module, will be the subject of a preflight briefing at the Russian Missicn Control Center in Korolev, Russia, outside Moscow, at 8 a.m. EST (4:00 p.m. Moscow time) on Nov. 17. The news conference will take place just three days before Zarya is scheduled to be launched atop a Russian Proton rocket from the Baikonur Cosmodrome in Kazakstan.

The news conference will be broadcast live on NASA Television, but questions can only be asked by reporters at the Russian Mission Control Center.

The participants will include:

Gretchen McClain, Deputy Associate Administrator for Space Station
Randy Brinkley, International Space Station (ISS) Program Manager
Mikhail Sinelchikov, Director of Piloted Programs, Russian Space Agency
Alain Poirier, Director General, Space Systems, Canadian Space Agency
Frank Longhurst, Head, Manned Spaceflight Program, European Space Agency
Tsuguo Tadakawa, Deputy Director, Space Utilization Promotion Dept., National Space Development Agency of Japan

Two days later, on Nov. 19, video of the final prelaunch preparations for Zarya and the rollout of the Proton rocket to its launch pad at Baikonur will be presented on the NASA TV Video File at noon EST.

Based on Zarya's current planned launch time of 1:40 a.m. EST (9:40 a.m. Moscow time, 11:40 a.m. Baikonur time,) on Nov. 20, NASA public affairs commentary and live television coverage of the countdown and the launch will begin at 1:10 a.m. EST (9:10 a.m. Moscow time).

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A postlaunch news conference will be held at Baikonur with senior level officials approximately two hours after launch. It is expected to be broadcast live on NASA Television with questions from reporters at Baikonur.

A second postlaunch news conference will be held at the Russian Mission Control Center following the Baikonur conference to give a technical status report on Zarya. It will be broadcast live on NASA TV with questions from reporters in Moscow.

Written status reports on Zarya's operation in orbit will be issued on subsequent days addressing major activation events leading up to the launch of the Unity connecting module aboard Endeavour on the first shuttle assembly mission, STS-88, on December 3. Following the STS-88 mission, with Zarya and Unity mated as the first Space Station elements, written status reports and status briefings on the unpiloted flight of the International Space Station will be provided periodically.

Note: News media planning to attend the news conferences or the Zarya launch from the Russian Mission Control Center, Korolev, who are not already accredited, should request press accreditation from the Russian press office at 011-7-095-187-2344, or by calling the NASA public affairs office in Moscow at 256-961-6225, 6226, or Russian line 586-75-60.

-end-

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For Release

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November 16, 1998

RELEASE: 98-204

WEILER NAMED ASSOCIATE ADMINISTRATOR FOR SPACE SCIENCE

NASA Administrator Daniel S. Goldin today named Dr. Edward J. Weiler as Associate Administrator for NASA's Office of Space Science, effective immediately.

Weiler has served as acting Associate Administrator since Sept. 28, following the departure of Dr. Wesley T. Huntress, Jr.

"In his short time as acting Associate Administrator, Ed Weiler has demonstrated both the management skills and scientific leadership that this position demands, and I am delighted he has accepted the offer on a more permanent basis," Goldin said.

In this capacity, Weiler will be responsible for providing overall executive leadership of NASA's Space Science Enterprise. This enterprise aims to achieve a comprehensive understanding of the origins and evolution of the Solar System and the Universe, including connections between the Sun and the Earth, the beginnings of life and the question of whether life exists elsewhere beyond Earth. It also is charged with communicating this knowledge to the public.

Weiler was appointed as Science Director of the Astronomical Search for Origins and Planetary Systems theme within the Office of Space Science in March 1996. He will continue to serve as the Program Scientist for the Hubble Space Telescope, a position he has held since 1979, until a replacement for that position is selected. Weiler joined NASA in 1978 as a staff scientist.

Prior to that, Weiler was a member of the Princeton University research staff and was based at NASA'S Goddard Space Flight Center, Greenbelt, MD, as the director of science operations of the Orbiting Astronomical Observatory-3 (COPERNICUS). Weiler received his Ph.D. in astrophysics from Northwestern University in January 1976.

Weiler lives in Bowie, MD, and has two children, Gregory, 9, and Allison, 12.

-end-

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November 16, 1998

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RELEASE: 98-205

THIRD U.S. SPACE STATION ASSEMBLY CREW NAMED

Astronaut James D. Halsell, Jr. (Lieutenant Col., USAF) will command the third Space Shuttle mission to carry cargo to space for the International Space Station in August 1999.

Joining Halsell in the flight deck for mission STS-101 aboard Atlantis will be Pilot Scott J. Horowitz, Ph.D. (Lieutenant Col., USAF). Rounding out the crew are Mission Specialists Mary Ellen Weber, Ph.D.; Edward Tsang Lu, Ph.D.; and Jeffrey N. Williams (Lieutenant Col., USA).

As the third International Space Station assembly flight, the mission will carry internal logistics and resupply cargo for station operations. The equipment will further the outfitting of the Russian Service Module.

"STS-101 will bring important components and equipment to the growing Station assembly," said James D. Wetherbee, Director of Flight Crew Operations and Deputy Director of NASA's Johnson Space Center, Houston. "This talented crew brings a great deal of experience and skill to make this key mission a success."

STS-101 will be Halsell's fifth mission, and his third as commander. Selected as an astronaut in 1990, he flew as pilot on STS-65 in 1994 and STS-74 in 1995, and as commander on STS-83 and STS-94 in 1997. Horowitz served as pilot in his two previous missions: STS-75 in 1996 and STS-82 in 1997.

Weber, a Mission Specialist onboard Discovery on STS-70, will be on her second space flight. Lu also will be on his second space trip; his first was STS-84 which docked to the Mir Space Station. Mission Specialist Williams will be making his first space flight.

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For biographical information on the STS-101 crew and other astronauts, see the NASA Internet astronaut biography home page at:

http://www.jsc.nasa.gov/Bios/

For information on the International Space Station, visit the Space Station home page at:

http://station.nasa.gov/

- end -

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For Release
November 23, 1998

RELEASE: 98-206

THE UNIVERSE "DOWN UNDER" IS THE TARGET OF HUBBLE'S LATEST DEEP-VIEW

Turning its penetrating vision toward southern skies, NASA's Hubble Space Telescope has peered down a 12 billion light-year long corridor loaded with a dazzling assortment of thousands of never-before seen galaxies. The observation, called the Hubble Deep Field South (HDF-S), doubles the number of far-flung galaxies available to astronomers for deciphering the history of the universe.

This new far-look complements the original Hubble "deep field" taken in late 1995, when Hubble was aimed at a small patch of space near the Big Dipper. The new region is in the constellation Tucana, near the south celestial pole.

The 10-day-long observation was carried out in October 1998 by a team of astronomers at the Space Telescope Science Institute (STScI), Baltimore, MD, and NASA's Goddard Space Flight Center, Greenbelt, MD. It is being made available today to the worldwide astronomy community for further research, and to the general public interested in the most distant reaches of the cosmos.

"The southern field promises to be the most studied area of the sky over the next five years," says STScI astronomer Robert Williams, when as STScI Director, he used his discretionary time to undertake the first deep field campaign, and has overseen the latest observation.

"We have eagerly awaited this new set of images ever since the first HDF, which had a dramatic impact on the entire science of astronomy. Hubble's deep field views revealed a large, heretofore unseen fraction of the universe and opened it up to interpretation and understanding."

It will take months for astronomers to digest what new secrets of the universe are within this latest look. At first glance the HDF-S appears to validate the common assumption that the universe should look largely the same in any direction.

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The two deep fields now give astronomers two "core samples" of the universe for better understanding the history of the cosmos. The pair of observations can be compared to more confidently infer the state of the cosmos as a whole. It would take astronomers 900,000 years to use Hubble to survey the entire sky to the depths of the HDF. So, they must rely on a thin, "looking-through-soda straw" view across the cosmos and infer the history of star and galaxy formation.

The new deep field also provides an astronomical gold mine for powerful new ground-based telescopes located in the southern hemisphere to undertake follow-up observations of galaxies and precisely measure their distances.

All of Hubble's new cameras and other instruments were trained on the sky simultaneously for the observation. The Space Telescope Imaging Spectrograph was used to dissect light from a quasar (bright, active core of a distant galaxy) in its field of view. The light from the quasar has traveled nearly three-quarters of the way across the universe, and provides a powerful three-dimensional probe of the universe's hidden structure. Invisible clouds of primeval hydrogen gas strung along billions of light-years between us and the quasar will be detectable in the signature of the quasar's light. The quasar is so brilliant it is like a searchlight shining through haze.

The original HDF engaged hundreds of astronomers around the world. Broad conclusions were drawn based on meticulous follow-up studies of the myriad galaxies along Hubble's extremely narrow line-of-sight. To date, conclusions about the rate of star formation and evolution of galaxy shapes have been based on this one narrow "core-sample" of the universe. Because the original HDF was picked as a seeming bland example of what the universe at large probably looks like, astronomers have assumed it was a representative sample. But they needed a second sample to validate early assumptions, and they needed a field that contained a distant quasar to give them important additional information that the northern field did not contain.

The Space Telescope Science Institute is operated by the Association of Universities for Research in Astronomy, Inc. (AURA) for NASA, under contract with NASA's Goddard Space Flight Center. The Hubble Space Telescope is a project of international cooperation between NASA and the European Space Agency.

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EDITOR'S NOTE: Images and photo captions associated with this release are available on the Internet at: **http://oposite.stsci.edu/pubinfo/1998/41** or via links in **http://oposite.stsci.edu/pubinfo/latest.html** or **http://oposite.stsci.edu/pubinfo/pictures.html**

Higher resolution digital versions (300 dpi JPEG) of the release photos are available at: **http://oposite.stsci.edu/pubinfo/1998/41**

TIFF image files are available at: **http://oposite.stsci.edu/pubinfo/tiff/1998/9841.tif**

NewsRelease

National Aeronautics and
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For Release

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November 17, 1998

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RELEASE: 98-207

NASA AND VANDERBILT UNIVERSITY ANNOUNCE SCHOLARSHIP PROGRAM

NASA and Vanderbilt University, Nashville, TN, have joined to sponsor a "Chroniclers of Discovery" Scholarship Program to help inspire and train students to become effective communicators of science, engineering, and technology to the public.

The two-tier scholarship combines the practical scientific and engineering experience of NASA; the academic expertise of Vanderbilt; the hands-on experience of the U.S. Space and Rocket Center in Huntsville, AL; the science communications background of the Discovery Channel, Bethesda, MD; and the resources of the Tennessee Space Grant Consortium and the National Space Grant College & Fellowship Program.

At the ninth/tenth grade level, scholarships will enable students to participate in a Science Communication Space Academy, and at the high school senior level, one student will win a full-tuition scholarship to attend Vanderbilt University, funded by NASA through the Tennessee Space Grant Consortium.

"NASA is committed to communicating to the American public what we learn through our mission of scientific research, space exploration and technology development, to benefit the quality of life on Earth," said Frank Owens, director of NASA's Education Division. "This requires a new emphasis in preparing students for both technical and communications professions. This new educational program demonstrates our commitment to this important realization."

The scholarships will be awarded in national competitions open to all eligible students. To be eligible, the student must also be accepted for admission to Vanderbilt. The winning high school senior then receives a full-tuition scholarship to Vanderbilt, which offers an interdisciplinary major in science communication.

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"The American public needs to be able to make informed decisions about the scientific and technological issues facing our society," said Dr. Rick Chappell, director of Vanderbilt's Office of Science and Research Communications. "We've seen a growing demand over the years for professional communicators who are trained in the sciences, and that's why we developed the Chroniclers of Discovery program."

In addition to being given the scholarship, the student also will be invited to participate in a summer work-study program at the Discovery Channel, where he or she will be able to develop science communication skills in a practical setting. Discovery is helping to promote the scholarships through its popular educational programs and web site for teachers.

Between 20 and 40 ninth and tenth grade winners will receive a scholarship to a special Science Communications Space Academy at the U.S. Space and Rocket Center. These scholarships are funded by several state members of NASA's Space Grant Consortium National Network. Students will spend a week learning about science, astronauts and space, and will take part in a simulated space flight. In addition, the student astronauts will prepare for and participate in a simulated press conference once they've "landed" back on Earth, where they will be asked to communicate their science results and space flight experience in clear and interesting terms.

Applicants will submit biographical information, teacher recommendations, and a written or videotaped story describing, in accurate and compelling terms, a past scientific discovery or technological advance. Entries -- following a specific set of guidelines -- are due by Jan. 15, 1999. A panel comprised of representatives from different science communications careers and from the supporting organizations will choose the winner of the Vanderbilt tuition scholarship. The Space Academy winners will be chosen by the Space Grant Consortia in their respective states. The Vanderbilt scholarship recipient will be honored at a special symposium on communicating discovery to be held at Vanderbilt in April 1999.

Interested high school seniors should contact Vanderbilt University Admissions (615/322-2561) for information and guidelines on the Vanderbilt Scholarship. Ninth and tenth grade students should contact the U.S. Space and Rocket Center (1-800-894-2575) for information and guidelines on the Science Communication Space Academy scholarships.

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For Release
November 18, 1998

RELEASE: 98-208

MINIATURIZED TRANSMITTER TO BE USED IN EFFORTS TO SAVE BABIES

Early next year, a NASA-developed "pill transmitter" is expected to begin monitoring mothers and their babies following corrective fetal surgery. The "pill" will monitor body temperature, pressure and other vital signs in the womb, radioing this critical information to physicians.

NASA's Ames Research Center, Moffett Field, CA, is developing the pill, which is about one-third-of-an-inch across and one-and-one-third-inches long, in cooperation with the Fetal Treatment Center at the University of California, San Francisco. Later, an even smaller pill will be developed that can be swallowed by astronauts so that NASA can track their vital signs during space travel.

"Nearly every time doctors operate on a fetus, the mother will later undergo pre-term labor that must be monitored," said Dr. Carsten Mundt, an electrical engineer on the Sensors 2000 team at Ames. "Pre-term labor is a serious problem that is difficult to predict and monitor with conventional equipment, and often leads to the death of the baby."

"But if you implant our pill, you can measure pressure changes in the uterus that result from contractions," Mundt said. "When doctors are able to monitor the magnitude and frequency of contractions, the physicians can identify the onset of pre-term labor early enough to prevent it from becoming life threatening to the fetus."

Earlier, pediatric surgeons at the Fetal Treatment Center pioneered a cesarean surgical approach to treat fetuses suffering from various birth defects including congenital diaphragmatic hernia. In this condition, a hole in the baby's diaphragm lets internal organs shift from inside the abdomen into the chest cavity, leaving insufficient room for lung development. Sixty to 75 percent of babies born with this condition perish. During some of these earlier surgeries, physicians implanted larger sensor-transmitters to monitor mothers and their fetuses.

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Recently, Fetal Treatment Center surgeons changed their technique from cesarean to a less-intrusive endoscopic method during which they make small incisions and insert tube-like devices through the mother's abdominal wall.

Normally, an endoscope is used to see into the interior of a body or hollow organ. Endoscopic instruments are now also used more frequently in surgeries requiring smaller incisions.

"This minimally invasive method represents the future of fetal surgery," said Michael Harrison, M.D., founding director of the Fetal Treatment Center, who in 1981 performed the world's first corrective surgery on a fetus before birth.

"Because there are no commercially available sensor-transmitters small enough to fit through the tubes used in the new endoscopic surgery technique, scientists and engineers on our team developed the pill-shaped device so that it can pass through the tubes," said Ames team member Mike Skidmore. "Our first pill-shaped device can transmit temperatures as well as the pressure of uterine contractions."

Ames scientists are testing a prototype version of another pill that can measure and transmit pH, or acidity in the fetus, according to Dr. Chris Somps, a scientist on the Sensors 2000 team. "Plans also call for even smaller pills that will measure the electrical activity of the fetal heart," he said. "These pills will transmit fetal heart data, as well as measurements of the baby's body chemicals including ionic calcium, carbon dioxide and glucose."

"We would also like to use this technology to study what happens to astronauts during space travel," said Skidmore. "Not only could they swallow the smaller pill transmitters we plan to develop, but we have a conceptual design of small, flat transmitters that can be taped to the body like plastic bandages."

"There are many possible medical uses for this technology; pills could monitor intestinal pressure changes, or stomach acidity in ulcer patients," Mundt said. "The acid-base balance in the body is a basic measure of health."

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RELEASE: 98-209

LANDSAT-7 LAUNCH SCHEDULED FOR APRIL 15

NASA has selected a new launch date of April 15, 1999, for the Landsat-7 Earth science satellite. The launch, originally scheduled for December 1998, will take place from Vandenberg Air Force Base, CA, on a Delta II launch vehicle.

The Enhanced Thematic Mapper Plus (ETM Plus), the science instrument on Landsat-7, will continue a database of high-resolution Earth imagery begun in 1982 by the Landsat-4 thematic mapper. As changes occur on the Earth's surface due to natural or human-induced events, scientists will be able to use the archive of imagery from the Landsat missions to better understand the behavior of the global environment. Landsat images provide information meeting the significant and diverse needs of business, science, education, government and national security. Applications for Landsat-7 imagery will include agricultural crop planning, timber issues in the Northwest, and information about population change and water quality.

Landsat-7 will add to the global archive of sunlit, substantially cloud-free images of the Earth's land surfaces. The spacecraft contains several technological improvements over previous Landsat satellites and their instruments. These improvements include better instrument calibration and a solid-state data recorder capable of storing 100 individual ETM Plus Earth images. This capability will enable Landsat-7 to update a complete global view of the Earth's land surfaces seasonally, or approximately four times per year. The Landsat series has provided the longest record of the Earth's continental surfaces as seen from space.

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"The launch delay of Landsat-7 was caused by a need for changes in the design of the electrical power-supply hardware for the spacecraft's instrument," said Phil Sabelhaus, Landsat-7 project manager at NASA's Goddard Space Flight Center, Greenbelt, MD. During instrument-level thermal vacuum tests beginning in December 1997, a power supply on the ETM Plus instrument failed twice. These technical challenges have been resolved and Landsat-7 is on track for launch. "We're satisfied that our design concerns have been met, and we're ready for a springtime launch of the spacecraft."

Landsat 7 will continue the legacy of the first U.S. Earth Resources Technology Satellite (ERTS-1), launched in 1972, by building upon the only global data record captured from space

The ETM Plus was designed and built by Raytheon (formerly Hughes) Santa Barbara Remote Sensing, Santa Barbara, CA. Lockheed Martin Missiles and Space built the Landsat-7 spacecraft, with integration of the instrument and spacecraft conducted at the company's facility in Valley Forge, PA.

NASA is developing in parallel to the Landsat-7 mission the next generation Landsat instrument and spacecraft technologies through the New Millennium technology demonstration program. This follow-on technology development effort will enable future measurements to be made by a sensor that is one-fourth the mass of the ETM Plus. A new sensor enabled by this development will use only 20 percent of the electrical power currently needed, while reducing the overall mission cost by 60 percent. The next generation Landsat flight demonstration is expected to launch in late 1999.

NASA intends to operate Landsat 7 and the flight demonstration spacecraft in the same orbit, but separated from each other by approximately one minute in distance. Such a flying formation will allow for observing the same area of Earth by both satellites, providing validation of the new imaging technologies being demonstrated. The advanced Landsat technology mission is intended to mitigate technological risk, improve future Landsat performance by a factor of four, and reduce overall mission development time by half.

Landsat is the central pillar of the national remote sensing capability. The Landsat 7 spacecraft was built to complement the research of NASA's Earth Science Enterprise, a long-term research program designed to study Earth's land, oceans, atmosphere, ice and life as a total integrated system. NASA's Goddard Space Flight Center manages the development of Landsat for the Earth Science Enterprise, NASA Headquarters, Washington, DC.

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RELEASE: 98-212

TRMM COMPLETES ONE YEAR OF DRAMATIC WEATHER OBSERVATIONS

The world's first space mission dedicated to observing and understanding tropical rainfall has successfully completed its first year of continuous data-gathering. Launched last fall, the Tropical Rainfall Measuring Mission (TRMM) spacecraft continues to provide exciting new insight into cloud and precipitation systems over the tropics.

TRMM is a joint U.S.-Japanese mission that was launched on Nov. 27, 1997, from the National Space Development Agency at Japan's Tanegashima Space Center. The TRMM satellite has produced continuous data since Dec. 8, 1997. Tropical rainfall -- that which falls within 35 degrees north and 35 degrees south of the equator -- comprises more than two-thirds of the rainfall on Earth. Changes in wind patterns generated by these tropical systems spread across the globe to impact weather patterns everywhere.

Launched to provide a validation for poorly known rainfall datasets generated by global climate models, TRMM has demonstrated its utility by reducing uncertainties in global rainfall measurements by a factor of two -- from approximately 50 percent to 25 percent. While pleased with the results to date, "there is clearly an aspect of tropical rainfall which does not fit our conceptual models," said Dr. Christian Kummerow, TRMM project scientist at NASA's Goddard Space Flight Center, Greenbelt, MD.

"At the moment, all fingers are pointing at the possibility that raindrops are significantly smaller than we used to believe. Looking 'under the hood,' of clouds with radars and radiometers has given us a unique perspective on the rain and ice processes. As soon as we make sense of all these new and sometimes contradictory observations, a whole new improved way of viewing and modeling rainfall processes should emerge. These particle sizes have the potential effect of regulating the amount of water vapor and ice being pumped into the upper atmosphere, which plays a key role in global climate change studies," added Kummerow.

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"The cloud types and area coverage generated by the rainfall process can directly alter the heat balance of the atmosphere," said Arthur Hou, deputy TRMM project scientist at Goddard. "The combined view of this process from all the TRMM sensors is offering an unprecedented insight here." Observations of cloud droplets near the cloud tops of thunderstorms have also yielded surprises. "The darker appearance of raining clouds and the unexpected suppression of rain in polluted atmospheres might be explained by the presence or absence of large raindrops near the cloud top," said Danny Rosenfeld, an Israeli scientist who is a member of the TRMM science team.

Scientists long have theorized that convection, or heat transfer, is different over land than over the ocean. TRMM's sensors provided direct observational evidence that faster and stronger convective updrafts over land are contributing to the formation of "taller" continental storms with more lightning. This is in contrast to the almost complete absence of lightning over the world's tropical oceans.

One unexpected phenomenon observed by TRMM was the massive tall chimney clouds in Hurricane Bonnie. While monitoring the progress of one of this year's most dramatic hurricanes, NASA researchers obtained compelling images of Hurricane Bonnie showing a (cumulonimbus) storm cloud, towering like a sky scraper, 59,000 feet into the sky from the storm's eyewall. This new view of "hot towers" in hurricanes could help forecasters predict hurricane intensity earlier, and identify those storms that will proceed to a stronger category.

Last July, TRMM shed new light on the phenomenon known as La Nina. TRMM research team members successfully retrieved sea-surface temperature data from the TRMM Microwave Imager (TMI) instrument aboard the spacecraft. This temperature data, obtained by the TMI, gives scientists the ability to obtain observations even in cloudy conditions. The coincidence of having both an El Nino and a La Nina event is giving scientists a rare opportunity to study the evolution of these events and the transition from one to another.

La Nina is essentially the opposite of the El Nino phenomenon and is characterized by unusually cold ocean temperatures in the eastern equatorial Pacific. An El Nino occurs when ocean temperatures are warmer than normal. La Nina and El Nino often are spoken of together and termed the El Nino/Southern Oscillations, or "ENSO." La Nina sometimes is referred to as the cold phase of the ENSO. An unexpected benefit from TRMM has been the almost immediate impact the data have had in improving the understanding of atmospheric water and energy cycle in assimilated global data sets. While still early, scientists are very encouraged that this improvement will lead directly to enhanced research efforts as well as better weather forecasts.

TRMM is part of NASA's Earth Science Enterprise, a long-term research program designed to study the Earth's land, oceans, air, ice and life as a total system. Images from the TRMM mission are available on the Internet at URL:

http://trmm.gsfc.nasa.gov/

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RELEASE: 98-213

SUBMILLIMETER WAVE ASTRONOMY SATELLITE TO STUDY STAR FORMATION

NASA's Submillimeter Wave Astronomy Satellite (SWAS) mission, scheduled for launch at 8:40 p.m. EST (5:40 p.m. PST) on Dec. 2, 1998, will gather star-formation data, which have remained invisible from beneath the obscuring effects of the Earth's atmosphere.

The overall goal of the two-year mission is to gain a greater understanding of star formation by determining the composition of interstellar clouds, and establishing the means by which these clouds cool as they collapse to form stars and planets.

"During its mission, SWAS will observe hundreds of regions of ongoing star formation within our galaxy. The answers SWAS will provide are important not only to the understanding of the formation of future stellar systems, but also to the understanding of the processes that led to the formation of the Sun, the Earth, and the other planets and moons in our own solar system," said Dr. Gary Melnick, Harvard-Smithsonian Center for Astrophysics, principal investigator for the SWAS mission.

SWAS will be launched from Vandenberg Air Force Base, CA, via a Pegasus-XL launch vehicle, built by Orbital Sciences Corporation. The launch vehicle is a three-stage, solid-propellant booster system carried aloft by an L-1011 jet aircraft. The system will be released when the aircraft reaches an altitude of about 40,000 feet (12,200 meters) and has airspeed of Mach 0.8. The SWAS mission is designed for a two-year duration.

SWAS is one of NASA's Small Explorers (SMEX) satellites, which are both small and economical. The SWAS spacecraft weighs only 625 pounds. The satellite was designed and built by NASA's Goddard Space Flight Center, Greenbelt, MD.

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The SWAS observatory will be inserted into an orbit with an altitude of 370 miles above the Earth, and will orbit the Earth every 97 minutes. SWAS will typically observe three to five astronomical objects per orbit. The observed data will be stored in the spacecraft memory and sent to a ground station. Within 24 hours of receipt at the ground station, these data are received at the Smithsonian Astrophysical Observatory's Science Operation Center in Cambridge, MA. There, the science content of the data is analyzed and new astronomical targets are selected for observation.

Further information about SWAS can be found on the Internet at:

http://sunland.gsfc.nasa.gov/smex/swas/
http://sunland.gsfc.nasa.gov/smex/
http://pluto.harvard.edu/cfa/oir/Research/swas.html

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RELEASE: 98-214

FIRST U.S. STATION ELEMENT TO BE LAUNCHED DEC. 3

NASA program managers set Dec. 3 as the official launch date for the STS-88 mission aboard Space Shuttle Endeavour. This is the first Shuttle mission dedicated to the assembly of the International Space Station (ISS), the largest and most complex international cooperative science and engineering venture in history.

The six-member flight crew will work to mate Endeavour's primary payload, the U.S.-made Unity connecting module, to the Russian-built Zarya control module during the 12-day mission. Zarya was launched on a Proton rocket from Baikonur Cosmodrome in Kazakstan on Nov. 20. While the STS-88 Flight Readiness Review was in progress, Russian flight controllers performed tests on Zarya's onboard systems and adjusted its orbital position.

The Flight Readiness Review, held at NASA's Kennedy Space Center, FL, began Monday afternoon allowing all Shuttle and ISS project offices to evaluate the flight readiness of the astronaut crew, vehicle and cargo, along with the launch and mission control teams.

"Following Zarya's successful launch last week, it is now NASA's responsibility to begin the International Space Station assembly process," said NASA's Johnson Space Center Director George Abbey. "This flight will clearly demonstrate the unique capabilities of the Space Shuttle and of astronauts and cosmonauts to assemble large structures in space. STS-88 will showcase the Shuttle as the safe and reliable workhorse of the space station era and other future activities in Earth orbit."

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Endeavour is scheduled for launch on Dec. 3 at 3:59 a.m. EST from launch pad 39A. The exact launch time will be determined during the final hour of the launch countdown as mission controllers pinpoint Zarya's exact orbital position. The mission is slated to last 11 days, 19 hours and 49 minutes. An on-time launch will lead to a Kennedy Space Center landing on Monday, Dec. 14, at 11:48 p.m. EST.

The STS-88 Mission Commander is Robert Cabana. The pilot is Fredrick Sturckow. Nancy Currie, Russian cosmonaut Sergei Krikalev, Jerry Ross and James Newman will serve as mission specialists on this flight.

STS-88 will be the 13th flight of Shuttle Endeavour and the 93rd mission in Shuttle program history.

-end-

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For Release
November 25, 1998

RELEASE: 98-215

DEEP SPACE 1 ION PROPULSION SYSTEM STARTS UP

The ion propulsion system on NASA's Deep Space 1 spacecraft came to life Tuesday, Nov. 24, and has continued running smoothly since.

The engine started up at 5:53 p.m. EST, in response to commands sent to the spacecraft. After running overnight in low-thrust mode, engineers commanded the engine to switch to higher-thrust modes today. The mission team plans to leave the engine running over the four-day Thanksgiving weekend.

The team originally powered up the engine Nov. 10, but the system shut itself off after running for 4-1/2 minutes. When controllers sent commands to the engine to turn itself on Tuesday, they planned to collect more data on the status of the system but believed it was unlikely the engine would keep running.

"We are very pleased that the engine started and continued to thrust," said Dr. Marc Rayman, Deep Space 1's chief mission engineer and deputy mission manager at NASA's Jet Propulsion Laboratory, Pasadena, CA. "In fact, it has been running very smoothly over the first day of its operation."

Engineers believe that the engine probably shut itself off when it was started two weeks ago because of metallic grit or other contamination between the two high-voltage grids at the rear of the advanced engine. It is likely that changes in temperature as the spacecraft conducted other technology validation activities affected the flakes, and powering-up the thruster may have vaporized the remains.

"It's common for new ion engines on the ground or on Earth-orbiting spacecraft to shut themselves off a few times when they are first exercised," said Rayman. "We would not be surprised if the engine shut itself off again over the first few days or weeks that it runs.

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"Deep Space 1's charter is to test new, advanced technologies," Rayman added. "If everything worked perfectly on the first try, it would be an indication we had not been sufficiently aggressive in selecting the technologies. Diagnosing the behavior we have seen is a very valuable part of Deep Space 1's objective of enabling future space science missions."

The fuel used in Deep Space 1's ion engine is xenon, a colorless, odorless and tasteless gas more than 4-1/2 times heavier than air. When the ion engine is running, electrons are emitted from a hollow bar called a cathode into a chamber ringed by magnets, much like the cathode in a TV picture tube or computer monitor. The electrons strike atoms of xenon, knocking away one of the 54 electrons orbiting each atom's nucleus. This leaves each atom one electron short, giving it a net positive charge -- making the atom what is known as an ion.

At the rear of the chamber is a pair of metal grids which are charged positive and negative, respectively, with up to 1,280 volts of electric potential. The force of this electric charge exerts a strong "electrostatic" pull on the xenon ions - much like the way that bits of lint are pulled to a pocket comb that has been given a static electricity charge by rubbing it on wool on a dry day. The electrostatic force in the ion engine's chamber, however, is much more powerful, causing the xenon ions to shoot past at a speed of more than 60,000 miles per hour (100,000 kilometers per hour), continuing right on out the back of the engine and into space.

At full throttle, the ion engine would consume about 2,500 watts of electrical power and puts out 1/50th of a pound (90 millinewtons) of thrust. This is comparable to the force exerted by a single sheet of paper resting on the palm of a hand.

When the engine was started Tuesday, it ran overnight, thrusting at a power level of 500 watts. This morning engineers commanded it to thrust at a level of 885 watts, then at 1,300 watts. Engineers may decide to have the engine thrust at a lower level while it runs over the next few days.

The ion propulsion system flight hardware was built for Deep Space 1 by Hughes Electron Dynamics Division, Torrance, CA; Spectrum Astro Inc., Gilbert, AZ; Moog Inc., East Aurora, NY; and Physical Science Inc., Andover, MA. Development of the ion propulsion system was supported by NASA's Office of Space Science and Office of Aeronautics and Space Transportation Technology, Washington, DC. JPL is managed for NASA by the California Institute of Technology.

-end-

Contract Announcement

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For Release
December 1, 1998

RELEASE: C98-t

NASA SELECTS LITTON/PRC FOR NASA SOUNDING ROCKET PROGRAM

NASA has selected Litton/PRC of McLean, VA, to perform services for a new contract which consolidates several previous service and supply contracts and other work supporting NASA's Sounding Rocket Program. The contract begins Feb. 1, 1999.

Services include designing, fabricating, integrating, testing and performing mission operations for sounding rocket missions.

"We are confident that the Litton/PRC team will continue the tradition of successful sounding rocket launches from sites worldwide in support of space and Earth science communities," said Mary Kicza, Associate Director of NASA's Goddard Space Flight Center, Greenbelt, MD.

The work will be performed at Goddard's Wallops Flight Facility, Wallops Island, VA, and at various off-site locations worldwide in support of Wallops projects. The services will be provided under a performance-based, cost-plus award and incentive fee, indefinite delivery/indefinite quantity (IDIQ) contract.

The basic contract is for four years with two, three-year options. The contract's minimum IDIQ value for the four-year basic contract is $11.9 million, and the potential maximum IDIQ value for the basic contract period is $211.8 million. The minimum value for the basic and two, three-year option periods is $31.9 million and the potential maximum value for the basic and two, three year option periods is $572.5 million.

The contractor also will provide performance task-order services for various Center programs using NASA Sounding Rocket Operations Contract government-furnished property, such as the fabrication and environmental test facilities at NASA's Wallops Flight Facility.

- more -

The NASA Sounding Rocket Operations Contract is an integral part of the "Wallops 2000" strategic plan, initiated in 1997, which provides a vision for Wallops to ensure its stability and vitality in the future. The majority of NASA civil service engineers and technicians working on the sounding rocket program will transition to advanced research and development projects including Space Shuttle small payloads, the ultra-long duration balloon program, and the University-class Explorer satellite program, as well as management of the new contract. Wallops will continue to manage the sounding rocket program for the Office of Space Science, NASA Headquarters, Washington, DC.

- end -

Contract Announcement

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600

For Release

Jennifer McCarter
Headquarters, Washington, DC
(Phone: 202/358-1639)

December 2, 1998

James Hartsfield
Johnson Space Center, Houston, TX
(Phone: 281/483-5111)

RELEASE: c98-u

ENGINEERING AND TESTING SUPPORT TO BE SUPPLIED BY INTERNATIONAL SPACE STATION CONTRACT MODIFICATION

NASA today signed a contract modification with The Boeing Company, Houston, TX, to supply additional engineering support and pre-launch testing for the International Space Station, increasing the prime space station contract held by Boeing by $163.4 million.

Boeing was awarded the eight-year prime contract, currently valued at $7.1 billion, for the construction and integration of the International Space Station in 1995. The modification, effective today, to the cost-plus-award-fee Space Station Contract NAS15-10000 with Boeing Information, Space and Defense Systems has a value of $163,477,000.

The modification will cover sustaining engineering for station elements, engineering support required after a component has been constructed and delivered to NASA, as well as support of multi-element integrated testing, a testing program which functionally links the various station components together prior to launch.

Work on the contract may be performed at Boeing facilities in Huntington Beach, CA.; Canoga Park, CA; Huntsville, AL.; Orlando, FL; Houston, TX; and at Honeywell, Inc., in Glendale, AZ.

--end--

Contract Announcement

National Aeronautics and
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For Release

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Headquarters, Washington, DC
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December 2, 1998

Nancy G. Neal
Goddard Space Flight Center, Greenbelt, MD
(Phone: 301-286-0039)

RELEASE: c98-v

NASA SELECTS RAYTHEON STX TO PROVIDE GODDARD SUPPORT

NASA has selected Raytheon STX Corporation of Lanham, MD, to provide routine data operations, and research and development support for the Space Science Data Operations Office and the National Space Science Data Center at the Goddard Space Flight Center in Greenbelt, MD.

This two-year contract, with three one-year options, is valued at $33,212,570 million. The contract started December 1, 1998.

The contractor's primary responsibilities include processing of space science data, and acquisition, modeling, analysis, archiving, and dissemination of NASA archival data and related information. The customers for these data are the scientific community, educators and the general public. The contractor's duties also include the development and maintenance of sophisticated computer, data storage, and information systems needed to perform the primary functions.

- end -

News Release

National Aeronautics and
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For Release

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December 4, 1998

RELEASE: 98-216

NASA ANNOUNCES SMALL BUSINESS TECHNOLOGY TRANSFER SELECTIONS

NASA has selected 12 research proposals for negotiation of Phase 2 contract awards for NASA's 1997 Small Business Technology Transfer Program.

The technology transfer program is designed to stimulate technological innovation, help small businesses become better qualified to assist NASA in its research and development, and increase private commercialization of federally funded research. The program also requires small businesses to conduct cooperative research and development by partnering with a research institution.

A total of 45 Phase II proposals were submitted by contractors completing Phase 1 projects. All proposals were peer reviewed for both technical merit and commercial potential. The combined award total for the 12 Phase 2 contracts is expected to be $6 million.

The STTR program management office is located at NASA's Goddard Space Flight Center, Greenbelt, MD, with executive oversight by NASA's Office of Aero-Space Technology, NASA Headquarters, Washington, DC. Individual STTR projects are managed by NASA's nine field centers.

- end -

EDITOR'S NOTE: A listing of the selected companies and their research institution partners can be accessed on the internet at URL: http://sbir.nasa.gov

NewsRelease

National Aeronautics and
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For Release

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Headquarters, Washington, DC
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December 1, 1998

RELEASE: 98-217

NASA ANNOUNCES RESEARCH GRANTS IN MICROGRAVITY BIOTECHNOLOGY

NASA has selected 48 researchers to receive grants totaling approximately $33 million to conduct microgravity biotechnology research. Forty of the grants are to conduct ground-based research, while the remaining eight are flight definition efforts. Fourteen of these grants are for continuation of work currently being funded by NASA, but the majority (34) represent new research efforts.

Sponsored by NASA's Office of Life and Microgravity Science and Applications, this research allows investigators to take advantage of a low-gravity environment to improve understanding of fundamental physical and chemical processes associated with biotechnology. The research support by NASA under this announcement includes protein crystallization, cell science studies, and new technology development. This research may affect such important areas as structure-based drug design, tissue engineering, and biosensor development.

The investigators will have NASA's microgravity research facilities such as aircraft flying parabolic trajectories and sounding rockets at their disposal; the flight-definition investigators will work toward experiments on the International Space Station.

NASA received 165 proposals in response to its announcement in this research area. These proposals were peer-reviewed by scientific and technical experts from academia, government and industry. In addition, those proposals selected for flight definition were reviewed in terms of engineering feasibility by a team from NASA's Marshall Space Flight Center. Huntsville, AL.

A list of awardees (by state), their institutions, and research titles can be found via Internet at: ftp://ftp.hq.nasa.gov/pub/pao/pressrel/1998/98-217a.txt

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December 1, 1998

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Stephanie Kenitzer
National Weather Service
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RELEASE: 98-218

CAMERAS AID SAN FRANCISCO AIRPORT WEATHER REPORTS

New digital video cameras installed by NASA at the San Carlos, CA, airport control tower, are helping to better report current weather conditions for aircraft landing at San Francisco International Airport, some 10 miles away.

Installed by engineers from NASA's Ames Research Center, Moffett Field, CA, the Airport Approach Zone Camera System enables air traffic controllers and weather forecasters to track real-time onset and dissipation of fog and low clouds in the airport's approach zone, particularly during the late morning. Since many aircraft arrive at that time, the precise timing of the improved visibility will improve the airport's ability to operate at or close to full capacity.

"The big problem with arrivals at San Francisco International Airport is that the runways are only 750 feet apart; when you can't use both runways at the same time, you can only land 30 aircraft an hour," said Yuri Gawdiak, an Ames aerospace engineer and the project leader. San Francisco International Airport is one of the nation's busiest, with 600-700 landings on a typical day. With both runways operating simultaneously, 60 aircraft an hour can land.

-more-

"The live pictures allow us to better serve the needs of the Federal Aviation Administration's (FAA) Air Traffic Management Specialists, here at the Oakland Air Route Traffic Control Center in Fremont, CA; the Oakland Bay TRACON (Terminal Radar Approach Control Facility) at the Oakland International Airport; and at the Air Traffic Control System Command Center in Washington, DC," said Walt Strach, National Weather Service Meteorologist in Charge of the Fremont facility.

The Airport Approach Zone Camera System will significantly reduce telephone calls between the FAA Oakland Center meteorologist and the San Francisco Air Traffic Control Tower. "This should translate into more efficient procedures for flow control when weather is a factor in landing aircraft at San Francisco International Airport," Strach said.

"The Airport Approach Zone Camera System is allowing meteorologists, both in my office and at the National Weather Service Forecast Office in Monterey, CA, to better see and understand the local effects of wind currents, and terrain, ocean and bay influences on the formation and dissipation of clouds and fog in and around San Francisco International Airport," Strach said. The Monterey weather office issues aviation, public and marine forecasts for the entire San Francisco Bay Area.

The high-speed video cameras operate 24 hours-a-day and provide a 220-degree field of view with rotation, zoom and tilt capabilities. The cameras are remotely controlled by personnel at the National Oceanic and Atmospheric Administration (NOAA) weather center located at the Oakland Air Route Traffic Control Center and are accessible via a secure web site. Ames engineers will install similar cameras at the San Francisco International Airport control tower in the near future.

The Airport Approach Zone Camera System is a joint effort between Ames, the FAA and NOAA. The project is managed by the aviation safety monitoring office at Ames and funded by NASA's aviation safety program.

- end -

News Release

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December 7, 1998

RELEASE: N98-70

LAUNCH OF ONE MARS MISSION AND RESULTS FROM ANOTHER FEATURED THIS WEEK

The first of two upcoming launches of NASA's 1998 Mars Surveyor missions, and exciting scientific findings from the Agency's current Mars mission will be featured this week on NASA Television.

NASA's Mars Climate Orbiter spacecraft is scheduled for launch aboard a Boeing Delta 2 launch vehicle on Thursday, December 10.

The day before this launch, on December 9, the lead scientist for the camera aboard the NASA spacecraft currently in orbit around the red planet, Mars Global Surveyor, will discuss the Top 10 images returned to Earth so far by that mission, including several new releases.

Today and tomorrow, the NASA TV Video File will feature replays of the first three-dimensional visualizations of the north pole of Mars, based on data from the laser altimeter aboard the Global Surveyor, released Sunday, December 6, at the American Geophysical Union meeting in San Francisco. These data have enabled scientists to estimate the volume of its water ice cap with unprecedented precision, and to study its surface variations and the heights of clouds in the region for the first time.

-more-

The Mars Climate Orbiter has two launch opportunities on December 10. The target is the first opportunity at 1:56:38 p.m. EST. A second opportunity at 3:02:23 p.m. EST is available if necessary. Liftoff will occur from Pad A at Launch Complex 17 on Cape Canaveral Air Station, FL.

When it first arrives at the red planet, Mars Climate Orbiter will be used primarily to support its companion Mars Polar Lander spacecraft, planned for launch on Jan. 3, 1999. After that, the Climate Orbiter's instruments will monitor the Martian atmosphere and image the planet's surface on a daily basis for one Martian year, the equivalent of two Earth years. During this time, the spacecraft will observe the circulation of atmospheric dust and water vapor, as well as characterize seasonal changes on the surface.

A prelaunch news conference is scheduled for Wednesday, December 9, at 11 a. m. EST in the NASA Kennedy Space Center (KSC) News Center auditorium and will be carried live on NASA TV. Following this briefing, the NASA TV Video File at Noon EST will feature animation and video footage of the Mars Climate Orbiter mission and the images from the press briefing to follow.

This 12:30 p.m. EST press briefing at KSC will feature the Top 10 images of Mars returned by the camera aboard Global Surveyor. Participants in this briefing will be Dr. Michael Malin, Principal Investigator for the camera, from Malin Space Science Systems, San Diego, and Joe Boyce, 1998 Mars Surveyor Program Scientist at NASA Headquarters in Washington.

Those media without permanent accreditation who wish to cover the launch of Mars Climate Orbiter, including the prelaunch news conference, should send a letter of request to the NASA KSC News Center on news organization letterhead. It should include name and Social Security number or passport number. Letters should be faxed to 407/867-2692.

NASA Television is available on GE-2, transponder 9C, located at 85 degrees West longitude, with vertical polarization. Frequency is 3880.0 megahertz, with audio on 6.8 megahertz.

STS-88 mission events may preclude live TV coverage of some Mars Climate Orbiter launch activities; in that case, launch footage will be replayed as soon as mission events allow. Audio only of Mars Climate Orbiter events will also be available on the "V" circuits, which may be dialed directly at 407/867-1260, 407/867-7135, 407/867-4003, 407/867-4920.

The NASA KSC codaphone will carry Mars Climate Orbiter prelaunch status reports beginning on Monday, December 7, and may be dialed at 407/867-2525

-end-

News Release

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December 7, 1998

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RELEASE: 98-219

LASER PROVIDES FIRST 3-D VIEW OF MARS' NORTH POLE

Measurements by a laser altimeter instrument orbiting aboard NASA's Mars Global Surveyor spacecraft are providing striking new views of the north pole of the red planet and the processes that have shaped it.

This first three-dimensional picture of Mars' north pole enables scientists to estimate the volume of its water ice cap with unprecedented precision, and to study its surface variations and the heights of clouds in the region for the first time.

The elevation measurements were collected by the Mars Orbiter Laser Altimeter (MOLA) aboard Global Surveyor during the spring and summer of 1998, as the spacecraft orbited Mars in an interim elliptical orbit. MOLA sends laser pulses toward the planet and measures the precise amount of time before the reflected signals are received back at the instrument. From this data, scientists can infer surface and cloud heights.

Approximately 2.6 million of these laser pulse measurements were assembled into a topographic grid of the north pole with a spatial resolution of .6 miles (one kilometer) and a vertical accuracy of 15-90 feet (5-30 meters). A peer-reviewed paper based on the measurements will be published in the Dec. 11 issue of Science magazine.

The topographic map reveals that the ice cap is about 750 miles (1,200 kilometers) across, with a maximum thickness of 1.8 miles (3 kilometers). The cap is cut by canyons and troughs that plunge to as deep as 0.6 miles (1 kilometer) beneath the surface. "Similar features do not occur on any glacial or polar terrain on Earth," said Dr. Maria Zuber of the Massachusetts Institute of Technology and NASA's Goddard Space Flight Center, Greenbelt, MD. "They appear to be carved by wind and evaporation of ice."

-more-

The MOLA data also reveal that large areas of the ice cap are extremely smooth, with elevations that vary by only a few feet over many miles. In some areas the ice cap is surrounded by large mounds of ice, tens of miles across and up to half a mile in height. "These structures appear to be remnants of the cap from a time when it was larger than at present," Zuber said. Impact craters surrounding the cap appear to be filled with ice and dust that was either deposited by wind or condensation, or perhaps remains from an earlier period when the ice cap was larger.

The shape of the polar cap indicates that it is composed primarily of water ice, with a volume of 300,000 cubic miles (1.2 million cubic kilometers). The cap has an average thickness of 0.64 miles (1.03 kilometers) and covers an area 1.5 times the size of Texas. For comparison, the volume of the Martian north polar cap is less than half that of the Greenland ice cap, and about four percent of the Antarctic ice sheet.

The estimated volume of the north ice cap is about 10 times less than the minimum volume of an ancient ocean that some scientists believe once existed on Mars. If a large body of water once existed on the red planet, the remainder of the water must presently be stored below the surface and in the much smaller south polar cap, or have been lost to space. But such a large amount of unaccounted-for water is not easily explained by current models of Martian evolution.

During its mapping of the north polar cap, the MOLA instrument also made the first direct measurement of cloud heights on the red planet. Reflections from the atmosphere were obtained at altitudes from just above the surface to more than nine miles (approximately 15 kilometers) on about 80 percent of the laser profiles. Most clouds were observed at high latitudes, at the boundary of the ice cap and surrounding terrain.

Clouds observed over the polar cap are likely composed of carbon dioxide that condenses out of the atmosphere during northern hemisphere winter. Many clouds exhibit dynamic structure probably caused by winds interacting with surface topography, much as occurs on Earth when winds collide with mountains to produce turbulence.

The principal investigator for MOLA is Dr. David E. Smith of Goddard. The MOLA instrument was designed and built by the Laser Remote Sensing Branch of Laboratory for Terrestrial Physics at Goddard. The Mars Global Surveyor Mission is managed by NASA's Jet Propulsion Laboratory, Pasadena, CA, for the NASA Office of Space Science.

Further information about MOLA and images created from its measurements of the north pole are available on the Internet at the following address: **http://ltpwww.gsfc.nasa.gov/tharsis/mola.html** A color image of the north pole from the camera aboard Mars Global Surveyor is available at: **http://www.msss.com/mars/global_surveyor/camera/images/MENUS/poles_list.html**

-end-

News Release

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For Release
December 7, 1998

RELEASE: 98-220

TOPEX/POSEIDON FINDS GLOBAL SEA LEVEL CHANGE DURING EL NINO

The 1997-98 El Niño event may have been a major contributor in the average global sea level rising about eight-tenths of an inch before it returned to normal levels, according to scientists studying TOPEX/Poseidon satellite measurements of sea surface height.

"This is the first time we have been able to identify that El Niño may cause a change in average global sea level," said Dr. R. Steven Nerem, a TOPEX/Poseidon science team member at the Center for Space Research at the University of Texas at Austin. "Understanding these short-term variations is important for understanding and detecting long-term variations caused by climate change."

"TOPEX/Poseidon measures average global sea level at ten-day intervals with a precision of 0.16 inches, so detecting the 0.8-inch change associated with the El Niño was relatively easy," Nerem said. "However, these results tell us that detecting sea level variations caused by climate change will be more difficult because such changes are significantly smaller than the variations we have observed during the El Niño."

Key to understanding the changes in the ocean are the global maps made by TOPEX/Poseidon. The sea level rise was not confined to the tropical Pacific, but also was observed in the Indian Ocean and the southern Pacific. Nerem's team then calculated the average global sea level.

"These six years of satellite data are a good start, but we really need a decade or more of continuous measurements before we can accurately detect any climate-induced change," said Dr. Lee-Lueng Fu, the TOPEX/Poseidon project scientist at NASA's

-more-

Jet Propulsion Laboratory (JPL), Pasadena, CA. "We need sustained observation records to understand the variations in the ocean."

Global mean sea level change on seasonal and inter-annual time scales is a measure of the changing heat content of the ocean. The 0.8-inch rise during the El Niño implies that on average the global ocean may be gaining heat.

"Average global sea level began rising in late March 1997, peaked at 0.8 inches above normal in early November 1997, and then began falling back to normal by the end of July 1998. Sea surface temperature began rising in late October 1996, peaked at 0.7 degrees Fahrenheit in late December 1997, and fell back to 0.2 degrees Fahrenheit at present," according to Nerem.

Developed by NASA and the French Centre National d'Etudes Spatiales (CNES), the TOPEX/Poseidon satellite, launched in August 1992, uses an altimeter to bounce radar signals off the ocean's surface to get precise measurements of the distance between the satellite and the sea surface. These data are combined with measurements from other instruments that pinpoint the satellite's exact location in space. Every ten days, scientists produce a complete map of global ocean topography, the barely perceptible hills and valleys found on the sea surface. A follow-on mission to TOPEX/Poseidon, Jason-1, is scheduled for launch in 2000.

An archive of TOPEX/Poseidon El Niño/La Niña images is available at:

http://www.jpl.nasa.gov/elnino

JPL manages the TOPEX/Poseidon mission for NASA's Earth Science Enterprise, Washington, DC. The Earth Science enterprise will combine measurements like those from TOPEX/Poseidon with other information about the land, sea, air, and life on Earth to develop a greater understanding and predictive capability of the global environmental system.

-end-

News Release

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For Release
December 10, 1998

RELEASE: 98-222

NASA, CENTRAL AMERICAN NATIONS SIGN EARTH SCIENCES PACT

NASA and the Central American Commission on the Environment and Development (CCAD) will use existing satellite data to develop land-use maps of Central America.

NASA Administrator Daniel S. Goldin and the President of the Central American Commission on the Environment and Development, and Minister of Environment and Natural Resources of El Salvador, Miguel Eduardo Araujo Padilla, today signed a Memorandum of Understanding (MOU) at NASA Headquarters, establishing cooperation between the CCAD and NASA in support of the Mesoamerican Biological Corridor.

Under the terms of the agreement, NASA centers as well as NASA-funded investigators and Central American researchers will use satellite data to develop maps classifying the land cover of the Central American isthmus according to life zones, land-use types, geological structure, hydrology, and other Earth Science factors. NASA also will support the development of the CCAD's environmental data and information system by making available optical, radar and topographic remote-sensing data to the CCAD. The agreement will initiate a new partnership between NASA and the countries of Central America and will demonstrate the utility of NASA Earth science data and information for both biodiversity conservation and sustainable-development planning.

The membership of the CCAD consists of the Governments of Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama, which have all agreed to work together within the CCAD framework to promote the sustainable development of the entire Central American region. In 1997 the Presidents of the seven Central American countries endorsed the concept of a Mesoamerican Biological Corridor, running throughout the Central American isthmus with the goal of integrating conservation and the sustainable use of the region's biodiversity into a framework for long-term economic development.

NASA's Marshall Space Flight Center, Huntsville, AL, and Jet Propulsion Laboratory, Pasadena, CA, will participate in the implementation of the agreement in support of NASA's Earth Science enterprise, Washington, DC. NASA's Office of Earth Science seeks to understand the total Earth system and the effects of natural and human-induced changes on the global environment.

-end-

PHOTO EDITORS' NOTE: Please call 202/358-1900 for photos of signing ceremony.

News Release

National Aeronautics and
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For Release

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December 11, 1998

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NOTE TO EDITORS: N98-71

BRIEFING SCHEDULE FOR NEAR RENDEZVOUS WITH ASTEROID EROS

The Near Earth Asteroid Rendezvous spacecraft's rendezvous with and orbit insertion of asteroid 433 Eros on Jan. 10, 1999, will be previewed at a media briefing at 1 p.m. EST, Wednesday, Dec. 16, 1998, at NASA Headquarters. The briefing will cover mission status, planned activities and science objectives for the first-ever asteroid rendezvous and orbit.

The briefing will originate from NASA Headquarters Auditorium, 300 E St., SW, Washington, DC, and will be carried live on NASA TV with two-way question-and-answer capability for reporters covering the event from participating NASA centers.

Panelists will be:

* Dr. Carl Pilcher, Director, Solar System Exploration, NASA Headquarters
* Dr. Robert W. Farquhar, NEAR Mission Manager, The Johns Hopkins University Applied Physics Laboratory (APL), Laurel, MD
* Dr. Andrew F. Cheng, Project Scientist, APL
* Dr. Donald K. Yeomans, Radio Science Team, NASA Jet Propulsion Laboratory, Pasadena, CA
* Dr. Joseph Veverka, Science Team Head, Cornell University, Ithaca, NY

Eros Encounter Activities – January 10-14, 1999

The NEAR spacecraft, launched in February 1996, will enter orbit around 433 Eros on Jan. 10, 1999, at 10 a.m. EST. Live video feeds from the Mission Operations and Science Data centers will be provided via a closed circuit to APL's Kossiakoff Center Auditorium, where mission background and status reports also will be presented throughout the morning starting at 8 a.m. EST for reporters covering the rendezvous.

-more-

A press briefing at noon EST, Jan. 10, 1999, in the Kossiakoff Auditorium will provide an early look at the rendezvous and early science and mission activities. Color and black-and-white images of Eros taken during NEAR's approach should be available for distribution. The briefing will be broadcast live on NASA TV with no two-way question-and-answer capability from NASA Centers. Reporters planning to cover the rendezvous at APL should call the Public Affairs office at 240/228-5113 for accreditation.

A press briefing at 1 p.m. EST, Jan. 14, 1999, also in the Kossiakoff Auditorium, will provide the latest images, mission information and science results from the first 3-4 days of NEAR's mission at Eros. The briefing will be broadcast live on NASA TV (no two-way question-and-answer). Results will also be posted on the NEAR Website at: **http://near.jhuapl.edu**

NASA Television is available on GE-2, transponder 9C, located at 85 degrees West longitude, with vertical polarization. Frequency is 3880.0 megahertz, with audio on 6.8 megahertz. Audio of the broadcast will be available on voice circuit at NASA's Kennedy Space Center on 407/867-1220, 1240, 1260.

- end -

News Release

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For Release
December 15, 1998

RELEASE: 98-223

NASA IN THE NEWS IN 1998

Aeronautics and space got noticed in '98 -- with the return of John Glenn to earth orbit, the start of International Space Station construction, and the discovery of ice on the moon. Background information is available to news media to illustrate the top 10 NASA stories of the year via the World Wide Web at the URLs listed. The video to accompany these stories will be available on NASA TV at noon today.

John Glenn Returns to Space

Senator John Glenn was named as a payload specialist last Jan. 16, and assigned to the crew of the Space Shuttle Discovery, which was launched Oct. 29, 1998, on a nine-day mission.
http://www.jsc.nasa.gov/Bios/htmlbios/glenn-j.html

First International Space Station Assembly

Phase II -- construction in orbit -- began with the first station elements launched in 1998: Zarya in November and Unity in December. Next, the first wholly Russian contribution, a component called the Service Module, will be launched from Russia in 1999.
http://spaceflight.nasa.gov/

Hubble Takes Image of Possible Planet Around Another Star

NASA's Hubble Space Telescope gave astronomers their first direct look at what is possibly a planet outside our solar system -- one that apparently has been ejected into deep space by its parent stars.
http://oposite.stsci.edu/1998/19

Most Powerful Gamma Ray Burst since Big Bang

A cosmic gamma ray burst detected this year released a hundred times more energy than previously theorized, making it the most powerful explosion since the creation of the universe in the Big Bang.
http://science.msfc.nasa.gov/newhome/headlines/ast06may98_1.htm

Lunar Prospector Discovers Ice on Moon

There is a high probability that water ice exists at both the north and south poles of the Moon, according to initial scientific data returned by NASA's Lunar Prospector this year.
ftp://ftp.hq.nasa.gov/pub/pao/pressrel/1998/98-038.txt

-more-

NASA Studies La Nina

Research scientists using data from the Tropical Rainfall Measuring Mission (TRMM), SeaWiFS and TOPEX/POSEIDON missions are shedding new light on the phenomenon known as La Niña. The images show changes in sea-surface temperature, and ocean current movement and the dissipation of El Niño. While it is too early to draw definite conclusions, the results to date appear to confirm the onset of La Niña-type conditions.
http://topex-www.jpl.nasa.gov/discover/el_nino.html

Antarctic Ozone Hole

In late 1997, larger levels of ozone depletion were observed over the Arctic than in any previous year on record. In 1998, using climate models, a team of scientists reported why this may be related to greenhouse gases.
ftp://ftp.hq.nasa.gov/pub/pao/pressrel/1998/98-058.txt

Magnetar

A neutron star, located 40,000 light years from Earth, is generating the most intense magnetic field yet observed in the Universe, according to an international team of astronomers led by scientists at NASA's Marshall Space Flight Center, Huntsville, AL.
http://science.msfc.nasa.gov/newhome/headlines/ast20may98_1.htm

Pathfinder Airplane

NASA's remotely piloted, solar-powered Pathfinder-Plus flying wing reached a record altitude of more than 80,000 feet during a developmental test flight Aug. 6 in Hawaii. The altitude is the highest ever achieved by a propeller-driven craft and surpasses the official record altitude of 71,530 feet for a solar-powered aircraft set by an earlier version of the Pathfinder last summer.
http://www.dfrc.nasa.gov/PAO/PressReleases/1998/98-64.html

Eileen Collins Named First Woman Shuttle Commander

First Lady Hillary Rodham Clinton announced from the White House in early 1998 that astronaut Eileen Collins (Lt. Col., USAF) would become the first woman to command a Space Shuttle when Columbia launches on the STS-93 mission in March 1999.
http://www.jsc.nasa.gov/Bios/htmlbios/collins.html

- end -

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For Release
December 16, 1998

RELEASE: 98-224

DOT, FAA AND NASA COMMEMORATE WRIGHT BROTHERS' 95TH ANNIVERSARY

The Department of Transportation, the Federal Aviation Administration (FAA) and NASA will commemorate the 95th anniversary of the Wright brothers' first flight with an aviation education event for nearly 200 area students. The event will be held on Thursday, Dec. 17. from 10 a.m. – 11:30 a.m. EST in the FAA auditorium, third floor, 800 Independence Ave., SW, Washington, DC.

"As we enter into the next century, it is important to have a skilled workforce. Historic events like these help introduce students to transportation careers and help them to understand what knowledge and abilities they will need to enter the high-tech transportation field," said U.S. Secretary of Transportation Rodney E. Slater.

This celebration will link education programs the agencies have in place — Garrett A. Morgan Technology and Transportation Futures Program and NASA CONNECT — to encourage students to think about transportation careers and to illustrate how math and science are used in real life.

The NASA CONNECT instructional television series will focus on navigation for this anniversary program. A segment called "Wherever You Go, There You Are" will be broadcast live, including participation from this Washington event, to PBS stations across the country from 10 a.m. – 10:30 a.m. EST on Dec. 17.

Following the live broadcast, winners of the Wright Brothers Poetry, Art and Music Contest will receive a poster depicting aviation pioneers by artist Frank Kulczak. Senator John Glenn, NASA Administrator Daniel S. Goldin and FAA Administrator Jane F. Garvey will sign the poster.

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A highlight of the event will be an opportunity for students to speak with some of aviation's real pioneers: Bill Broadwater, Tuskegee Airman and a retired FAA controller, and Christopher Hart, FAA Assistant Administrator for System Safety.

"The Space Shuttle on its way to the International Space Station, a spacecraft on its way to Mars, and an aircraft that flies safer than ever before all have one thing in common: They are made possible by people who studied and excelled in math and science," said Goldin. "If our nation's young people understand the importance of these subjects, there is no doubt America will reach its destination of greatness in the 21st Century."

"Throughout its history, the aviation industry has succeeded and thrived largely because of the vision and dedication of pioneers like Orville and Wilbur Wright. Aviation's continued success depends on the ability of our next generation of aviators, today's youth, to keep the Wright brother's legacy alive," said Garvey.

The event will include industry representatives from the Experimental Aircraft Association, Professional Aviation Maintenance Association and the National Air Transportation Association.

Area schools participating in the activities include: Thomas Jefferson High School, Fairfax, VA; Thomas Edison High School, Springfield, VA; Tuckahoe Elementary School, Arlington, VA; Bradbury Heights Elementary School, Capitol Heights, MD; District Heights Elementary School, District Heights, MD; Doswell Brooks Elementary School, Capitol Heights, MD; Concord Elementary School, Capitol Heights, MD; Shadyside Elementary School, Shadyside, MD; Hyattsville Middle School, Hyattsville, MD; Sligo Middle School, Rockville, MD; Harlem Park Elementary School, Baltimore, MD; Malcolm X Elementary School and Lucy B. Slowe Elementary School, Washington, DC.

More than 700,00 students and 10,000 teachers nationwide have registered to view the live PBS program.

After the event at FAA, students will tour the Smithsonian's National Air & Space Museum and see the actual Flyer flown by the Wright brothers.

This will be the first of a series of events leading to the 100th anniversary of the Wright brothers' first flight in 2003.

Please contact FAA or NASA public affairs (see phone numbers listed above) if you plan to attend.

- end -

News Release

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For Release
December 21, 1998

RELEASE: 98-225

NASA RENAMES TELESCOPE AND SETS NEW LAUNCH DATE

NASA today set a new launch date for the Advanced X-ray Astrophysics Facility (AXAF), and announced that it will be renamed the Chandra X-ray Observatory in honor of the late Indian-American Nobel Laureate Subrahmanyan Chandrasekhar.

The Chandra X-ray Observatory will be shipped to NASA's Kennedy Space Center, FL, on or before Jan. 28 and launched no earlier than April 8, 1999. The launch date will depend upon the actual shipping date and the results of a mid-February independent review of progress towards preparing the Cambridge, MA, operations center for launch.

Chandra will be carried to space aboard the Space Shuttle Columbia on mission STS-93, commanded by astronaut Eileen Collins. The shipment of the spacecraft was delayed in mid-October so the prime contractor, TRW Space and Electronics Group, Redondo Beach, CA, could complete testing on flight software.

"Chandra," a shortened version of Chandrasekhar's name, which he preferred among friends and colleagues, was chosen in a contest to rename AXAF. "Chandra" also means "Moon" or "luminous" in Sanskrit. The winners are a high school student in Laclede, ID, and a teacher in Camarillo, CA.

"Chandrasekhar made fundamental contributions to the theory of black holes and other phenomena that the Chandra X-ray Observatory will study. His life and work exemplify the excellence that we can hope to achieve with this great observatory," said NASA Administrator Daniel Goldin.

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"Chandra probably thought longer and deeper about our universe than anyone since Einstein," said Martin Rees, Great Britain's Astronomer Royal.

Chandrasekhar, widely regarded as one of the foremost astrophysicists of the 20th century, won the Nobel Prize in 1983 for his theoretical studies of physical processes important to the structure and evolution of stars. He and his wife emigrated from India to the U.S. in 1935. He served on the faculty of the University of Chicago until his death in 1995.

The Chandra X-ray Observatory will help astronomers world-wide better understand the structure and evolution of the universe by studying powerful sources of X-rays such as exploding stars, matter falling into black holes and other exotic celestial objects. X-ray astronomy can only be done from space because Earth's atmosphere blocks X-rays from reaching the surface. Chandra will provide images that are fifty times more detailed than previous X-ray missions. At more than 45 feet in length and weighing more than five tons, it will be one of the largest objects ever placed in Earth orbit by the Space Shuttle.

Tyrel Johnson, a student at Priest River Lamanna High School in Priest River, ID, and Jatila van der Veen, a physics and astronomy teacher at Adolfo Camarillo High School, in Camarillo, CA, submitted the winning name and essays. They will receive a trip to NASA's Kennedy Space Center in Florida to view the launch of the Chandra X-ray Observatory, a prize donated by TRW. In all, 59 people submitted the name "Chandra." Altogether, the contest drew more than 6,000 entries from all 50 states and 61 countries. The seven members of the selection committee included a top aerospace executive, journalists, scientists and a university professor.

The Chandra X-ray Observatory program is managed by NASA's Marshall Space Flight Center, Huntsville, AL, for NASA's Office of Space Science, Washington, DC. The Smithsonian Astrophysical Observatory (SAO) controls science and flight operations of the observatory for NASA from Cambridge, MA.

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EDITORS NOTE: Further information, images and audio on NASA's Chandra Observatory is available on the internet at: **http://www.msfc.nasa.gov/news** and **http://xrtpub.harvard.edu**

For information about S. Chandrasekhar, or comments from his Chicago colleagues, including those who will use the Chandra X-ray Observatory, contact Steve Koppes, University of Chicago, 773/702-8366, or via email at s-koppes@uchicago.edu

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RELEASE: 98-226

FUTURE MISSIONS TO STUDY CLOUDS, AEROSOLS, VOLCANIC PLUMES

NASA has chosen for development three small spacecraft missions designed to explore the Earth's dynamic systems early in the new millennium under the Office of Earth Science's Earth System Science Pathfinders (ESSP) program.

The primary mission is PICASSO-CENA (Pathfinder Instruments for Cloud and Aerosol Spaceborne Observations -- Climatologie Etendue des Nuages et des Aerosols), co-led by NASA's Langley Research Center, Hampton, VA, and the Institut Pierre Simon Laplace, Paris, France. The instruments on PICASSO-CENA are designed to address the role of clouds and small atmospheric particles known as aerosols and their impact on Earth's radiation budget -- a balance of solar energy reaching the Earth and lost to space that ultimately controls the temperature of the Earth.

PICASSO-CENA will employ innovative light-detection and ranging (LIDAR) instrumentation to profile the vertical distribution of clouds and aerosols, while another instrument will simultaneously image the infrared (heat) emission of the atmosphere. During the daylight half of its orbit, PICASSO-CENA will measure the reflected sunlight in an oxygen-absorption band and take images of the atmosphere with a wide-field camera. PICASSO-CENA, together with the Earth Observing System satellites, will establish the scientific basis for understanding the dynamics and energetics of Earth's atmosphere in support of short-term weather and long-term climate forecasts.

"For the first time we will be able to construct the three dimensional structures of the atmosphere to better understand the role of clouds and aerosols in Earth's climate," said Dr. Ghassem Asrar, Associate Administrator for Earth Sciences, NASA Headquarters, Washington, DC.

The estimated mission cost of PICASSO-CENA, including launch vehicle, is $173.5 million. NASA will provide $117.4 million, with France providing $56.1 million. The spacecraft will be launched in 2003. PICASSO-CENA consists of a unique partnership among Langley; France's Centre National D'Etudes Spatiales (CNES); the Institut Pierre Simon Laplace; Hampton University of Hampton, VA, (a historically black university); Ball Aerospace and Technology Corporation, Boulder, CO; and NASA's Goddard Space Flight Center, Greenbelt, MD. The provision by France of a PROTEUS spacecraft, the infrared imaging system, and science analysis support make this mission a true international partnership.

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"This is truly an excellent example of domestic and international partnership toward answering a major climate-related scientific question," Asrar said.

In addition to PICASSO-CENA, NASA has chosen two additional ESSP missions, CloudSat and VOLCAM (the Volcanic Ash Mission), as alternate missions. CloudSat and VOLCAM will go through an extended development and technology assessment prior to the decision of which mission will be the primary and alternate.

CloudSat is a mission focused on understanding the role of thick clouds in the Earth's radiation budget. CloudSat would use advanced cloud-profiling radar to provide information on the vertical structure of highly dynamic tropical cloud systems. This new radar would enable measurements of cloud properties for the first time on a global basis, revolutionizing our understanding of cloud-related issues.

VOLCAM is a pathfinder mission for demonstrating the operational and scientific applications of monitoring volcanic clouds and aerosols from a geostationary orbit. Volcanic clouds are a potential hazard to jet aircraft. Several instances of damage to commercial airliners by volcanic ash have occurred, in at least one case nearly leading to a catastrophic crash. In addition to causing air traffic hazards, volcanic eruptions increase the amount of aerosol particles in the upper atmosphere. Increased scattering of sunlight in the upper atmosphere blocks the sunlight, leading to cooler temperatures at the Earth's surface. The information provided by VOLCAM would provide data to better represent the transport of volcanic aerosols in global atmospheric-circulation models of the Earth's climate and weather.

The estimated mission cost of CloudSat would be $144.6 million, with NASA contributing $119.6 million. Collaboration with Canada is being explored for the provision of critical components for CloudSat's cloud-profiling radar. The estimated mission cost of VOLCAM would be $48 million, of which NASA would provide $45 million and other U.S. government agencies would provide $3 million. The VOLCAM mission is intended to launch using a "piggyback" approach involving one of several potential spacecraft of opportunity.

The philosophy of the ESSP program is to achieve maximum science value while complementing existing or planned flight missions. The Principal Investigator (PI) is responsible for developing the flight mission hardware from selection to a launch-ready condition within 36 months, with minimal direct NASA oversight. The PI and mission team are responsible for accomplishing the stated scientific objectives and delivering resulting data to the broader Earth science community and general public as expediently as possible.

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December 30, 1998

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NEAR SPACECRAFT SET FOR JAN. 3 BURN

A confident NEAR mission operations team is preparing to fire the main engine of the Near Earth Asteroid Rendezvous (NEAR) spacecraft at noon on Jan. 3 to put the mission on course for a rendezvous with its target, asteroid 433 Eros, in just over a year.

The upcoming burn will last 24 minutes and will increase the spacecraft's speed by 2,100 mph (939 meters per second), putting it at close to the same speed as Eros. The burn will be divided into an initial three-minute "settling burn" with the spacecraft's small hydrazine thrusters that will change its velocity by only 11 mph (five meters per second), and a 21-minute firing of the bipropellant main engine that will provide the rest of the velocity change.

The burn will lessen the distance between NEAR and Eros as they orbit the sun. For the next year NEAR will travel behind Eros in a slightly closer orbit to the sun. By mid-February 2000, NEAR will catch up to Eros. The spacecraft will then enter orbit around Eros and begin its planned yearlong study of the asteroid.

The spacecraft's first attempted rendezvous burn was aborted on Dec. 20, 1998, just seconds after the settling burn was completed. An investigation by mission personnel revealed that the brief engine burn exceeded certain safety limits associated with the onboard system that autonomously controls the spacecraft. This resulted in the engine abort. Reprogramming of these values is now being completed and the spacecraft will be ready for the Jan. 3 burn.

"We're very confident that we've found the problems associated with the Dec. 20 abort," says Thomas B. Coughlin, NEAR Project Manager at the Johns Hopkins University Applied Physics Laboratory (APL) in Laurel, MD, which manages the

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mission for NASA. "The abort lost us time but the flyby gave us valuable information about Eros' shape and mass that we wouldn't have had -- information that will help us during our orbital phase a little more than a year from now."

Because the spacecraft did not complete the Dec. 20 burn, the opportunity to orbit Eros next month as originally planned was lost. The setback presented mission planners with a huge challenge but also an unexpected opportunity. Within days of the abort, the NEAR team developed a complicated command sequence for a Dec. 23 flyby of Eros to obtain multicolor images, near-infrared spectra, and magnetic field measurements. The commands were uploaded swiftly to the spacecraft and executed as planned, producing images of the asteroid and valuable data that is now being processed.

Despite the delay, NEAR is expected to complete all its science objectives. To follow the NEAR mission as it unfolds, visit the project Web site at: http://near.jhuapl.edu

Updates on mission activities and science results are also available by phone on the NEAR Hot Line at (240) 228-5413. Due to the rescheduling of mission events, the previously announced Jan. 10 and Jan. 14 press briefings have been canceled.

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